# Trains

October 1944

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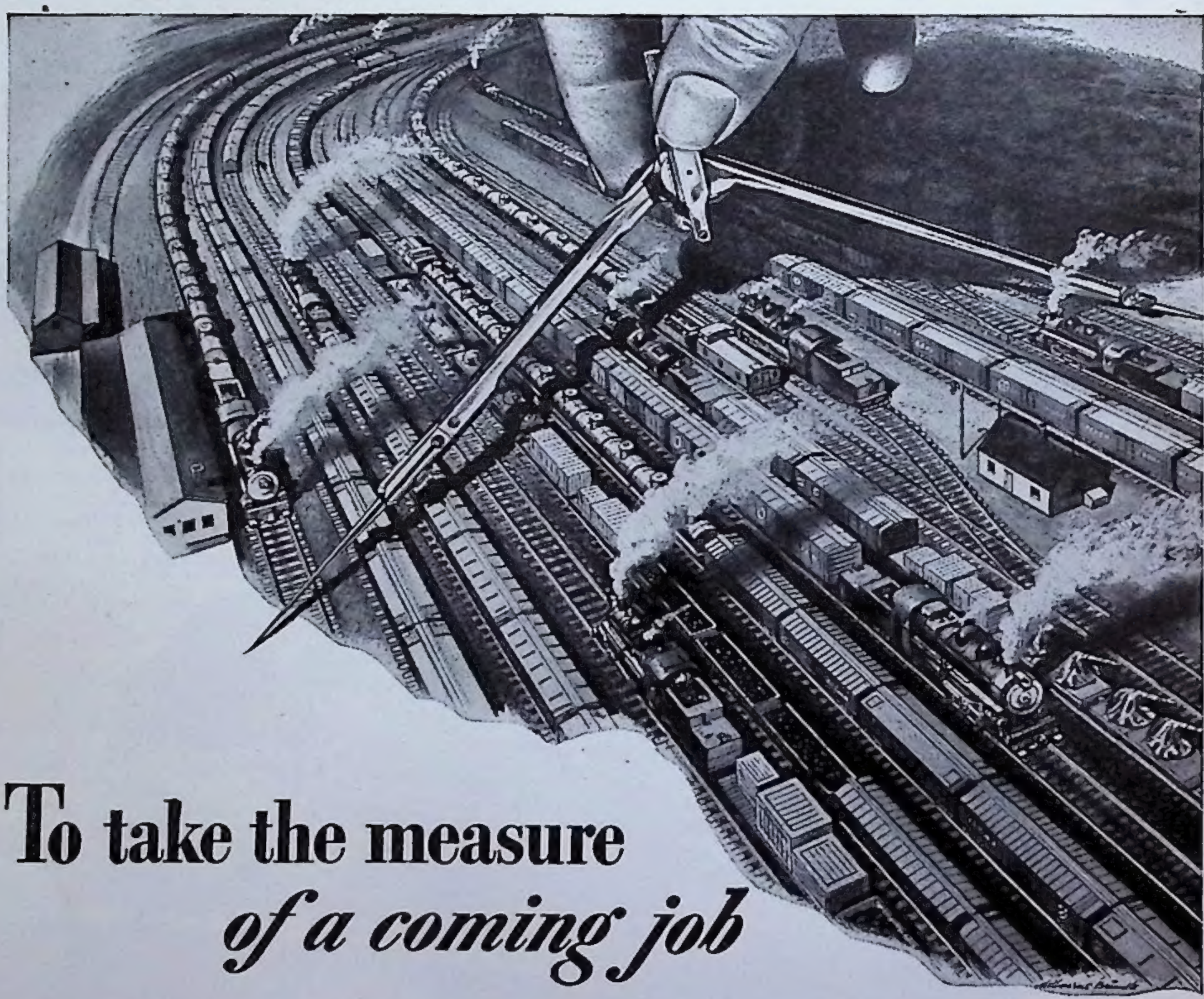
THIS ISSUE

*Invasion Railroads* Signal Corps Photos

THE NORTH SHORE LINE • THE SIGNAL TOWER

NORTH WESTERN'S PROVISO YARD—WORLD'S LARGEST



# To take the measure *of a coming job*

FEW PEOPLE notice or even think of the many special abilities the railroads have been required to develop. One of these is accurately anticipating the need of agriculture and other industry for rail transportation.

Because they do this, freight cars for years have almost always appeared at the right place, at the right time and in the right number. This has been a *must* for orderly marketing and efficient low-cost transportation.

Today, while everything they have is working day and night to hasten victory, the railroads are busy also taking the measure of the jobs that lie ahead.

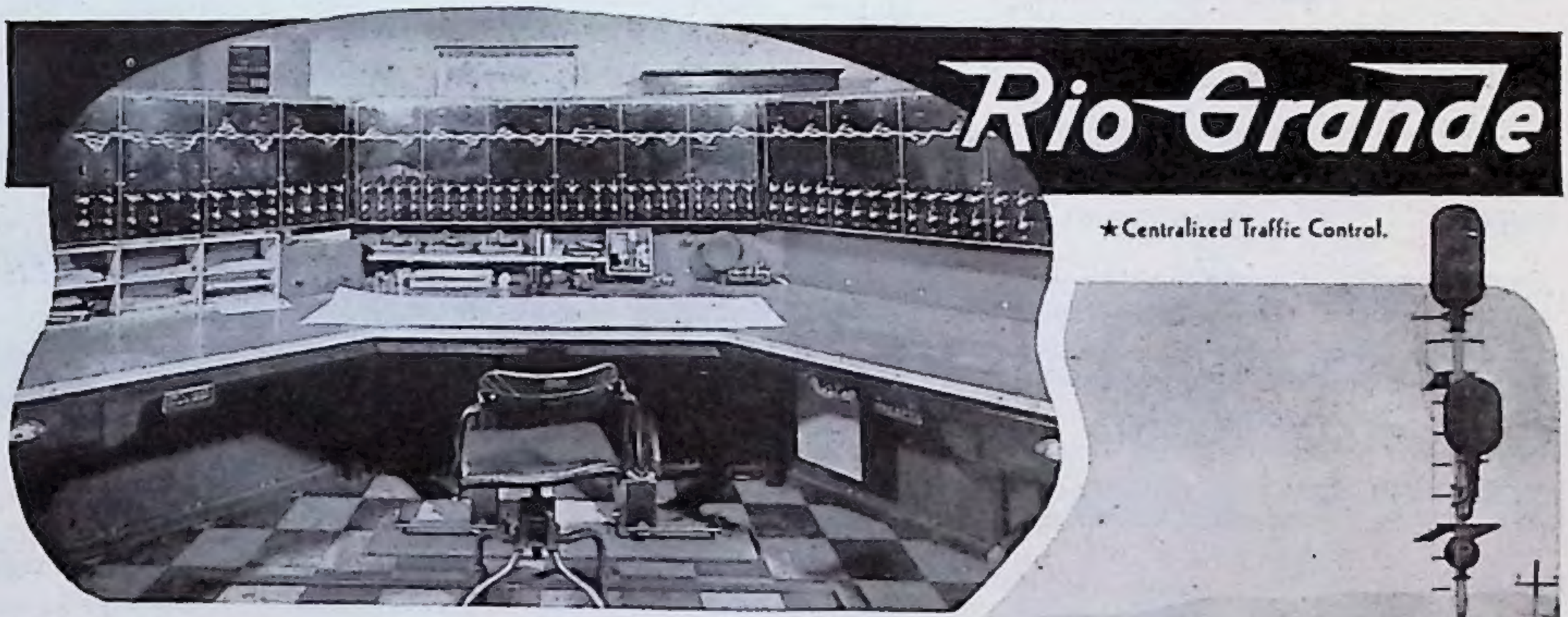
What new kinds of goods will have to be carried? What kinds of cars will they need? Where will they come from and where will they go? What service and rates will be needed to develop business, shipping and employment?

Long before the call comes for postwar action, the answers to these and hundreds of other questions must be ready. Finding the answers to these questions is the work of a separate group of seasoned railroaders—the Railroad Committee for the Study of Transportation.

In this way, the railroads are looking ahead to the time when America turns again to peacetime work—and planning their necessary part in helping to make it a wonderful land to live in, just as they have helped make it strong in time of war.

ASSOCIATION OF
**AMERICAN RAILROADS**
ALL UNITED FOR VICTORY

# CTC★—Modern Magic

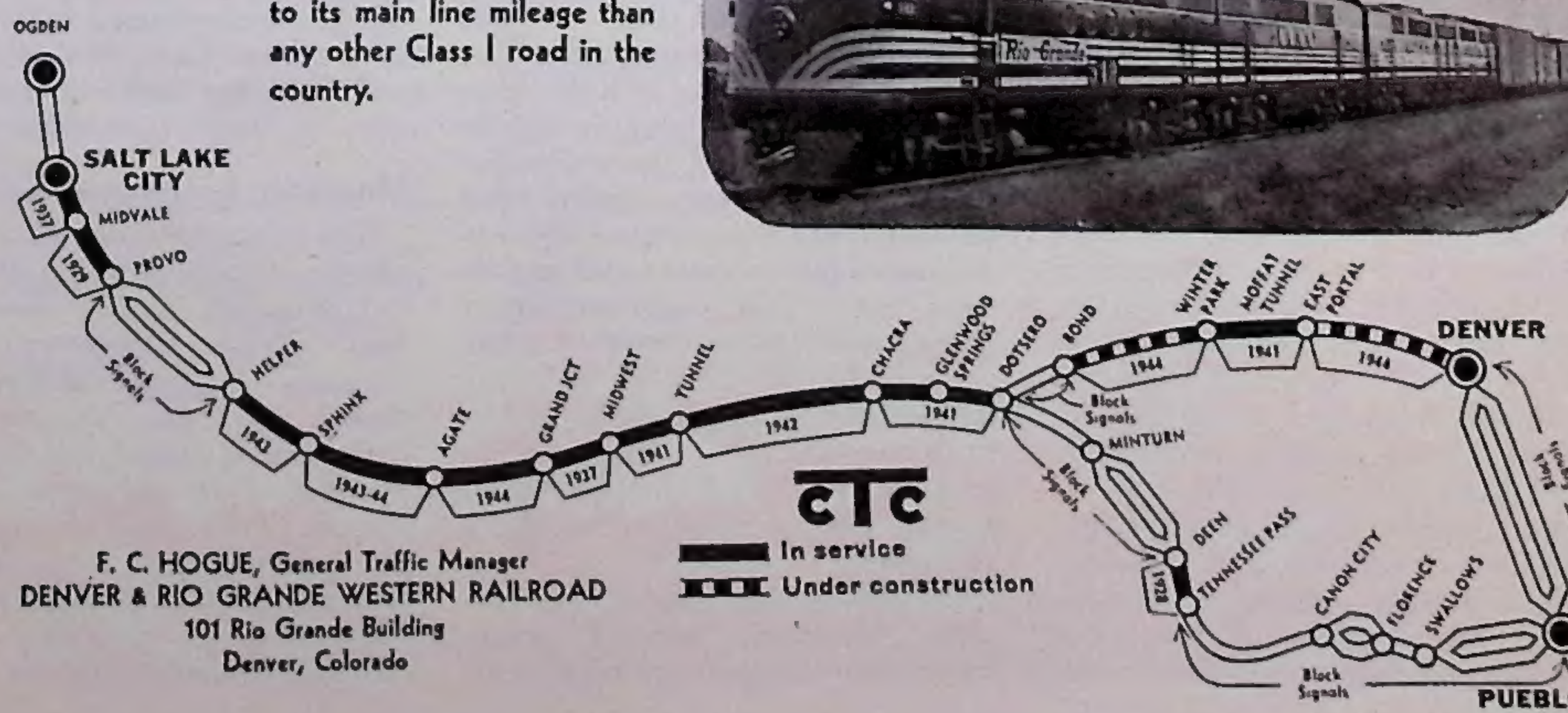



*16 panel CTC board at Green River, Utah, controls 130 miles of Rio Grande main line.*

The raw materials of Victory are rolling day and night over rails of the Rio Grande in a volume that could not have been foreseen by the most optimistic prophet five years ago. Contributing largely to our ability to handle this flood of vital war traffic is the extensive system of Centralized Traffic Control now in operation and currently being augmented by new CTC installation.

This modern method of dispatching trains has expedited the handling of a tremendous war tonnage.

The Rio Grande pioneered in CTC—the original installation in 1928 was the first by any western railroad. And at the present time, the Rio Grande has more CTC in proportion to its main line mileage than any other Class I road in the country.

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# Trains

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*American railroads produce the world's most efficient common-carrier mass transportation and are the foundation of our country's industrial productivity.*

FIRST and most obvious thought about the government's anti-trust suit against the railroads is that it is a political move. Filing suit more than a year before the prosecution's case will be ready is just not logical, especially when so doing puts dozens of war-busy railroad executives on the defensive against general charges for which the legal basis is not announced.

Less obvious conclusion, but no less unmistakable to students of transportation, is that the suit represents either a complete reversal of government policy or else basic differences of opinion between branches of the government. Much that is caustically criticized by Messrs. Biddle & Berge originated under government pressure or suggestion.

Railroad cooperation in setting rates dates back to the original Interstate Commerce Act in 1887. For the public good the principle of equal rates between the same points was set up and has been enforced to this date, with certain exceptions for routes offering differential service. In order to conform with this basic principle the railroads have had to set up bureaus for cooperative preparation and filing of tariffs. The I. C. C., before making tariffs effective, entertains objections, and hearings sometimes last months with shippers and chambers of commerce given every opportunity to object. The trust busters would trade this system of regulated equality of rates for the overly competitive rate wars of the Gould-Vanderbilt days which brought on the Interstate Commerce Act.

Association of American Railroads, one of the defendants in the anti-trust suit, was formed in 1934 after the suggestion of Federal Coordinator of Transportation Joseph Eastman, who said, "It is not too much to hope that the railroads may be able to form 'a more perfect union' to deal with matters of common concern such as . . . new types of equipment, new forms of service, the unification of terminal operations and readjustment of the rate structure." The formation of the A. A. R. was discussed beforehand with both the President and Mr. Eastman, and Mr. Eastman called it a "gratifying step in the right direction."

The so-called secret (it was publicly announced at the time) Western Agreement followed the hint of the Interstate Commerce Commission, which in declining a rate increase in 1931 said, "The railways can with advantage pursue a policy of greater cooperation. The waste in revenues and expenses resulting from undue and unwise competition of the railroads with each other we believe to be of very large proportions." With the aid of the Western agreement the western lines, in the midst of the depression, put through the greatest improvement program in railroad history, and any traveler of the middle 30's will be quick to agree that air conditioning, faster schedules, lower fares and other improvements came faster on the western lines than elsewhere. If, as Berge & Biddle charge, the Western Agreement delayed improvements, why did streamlining, low-cost meals, inexpensive diverse-route and round-trip fares, solid air-conditioned trains and other improvements come so quickly west of Chicago? It was because the roads agreed to work together in a united front to improve railroad transportation against the competition of buses and trucks.

In 1932 at Salt Lake City, President Roosevelt himself made statements strangely at odds with the announced intent of the anti-trust suit. He said, "Regulation, in fact, has protected investors as well as patrons and I think that no enlightened railroad man would care to go back to the old days when unregulated railroad operation landed one-third of the railroad mileage in receivership. I believe the policy of enforced competition between railroads can be carried to unnecessary lengths. . . . The railroad mesh is the warp on which our economic web is largely fashioned. It has made a continent into a nation. It has saved us from splitting, like Europe, into small clashing units. It has made possible the rise of the West. It is our service of supply."

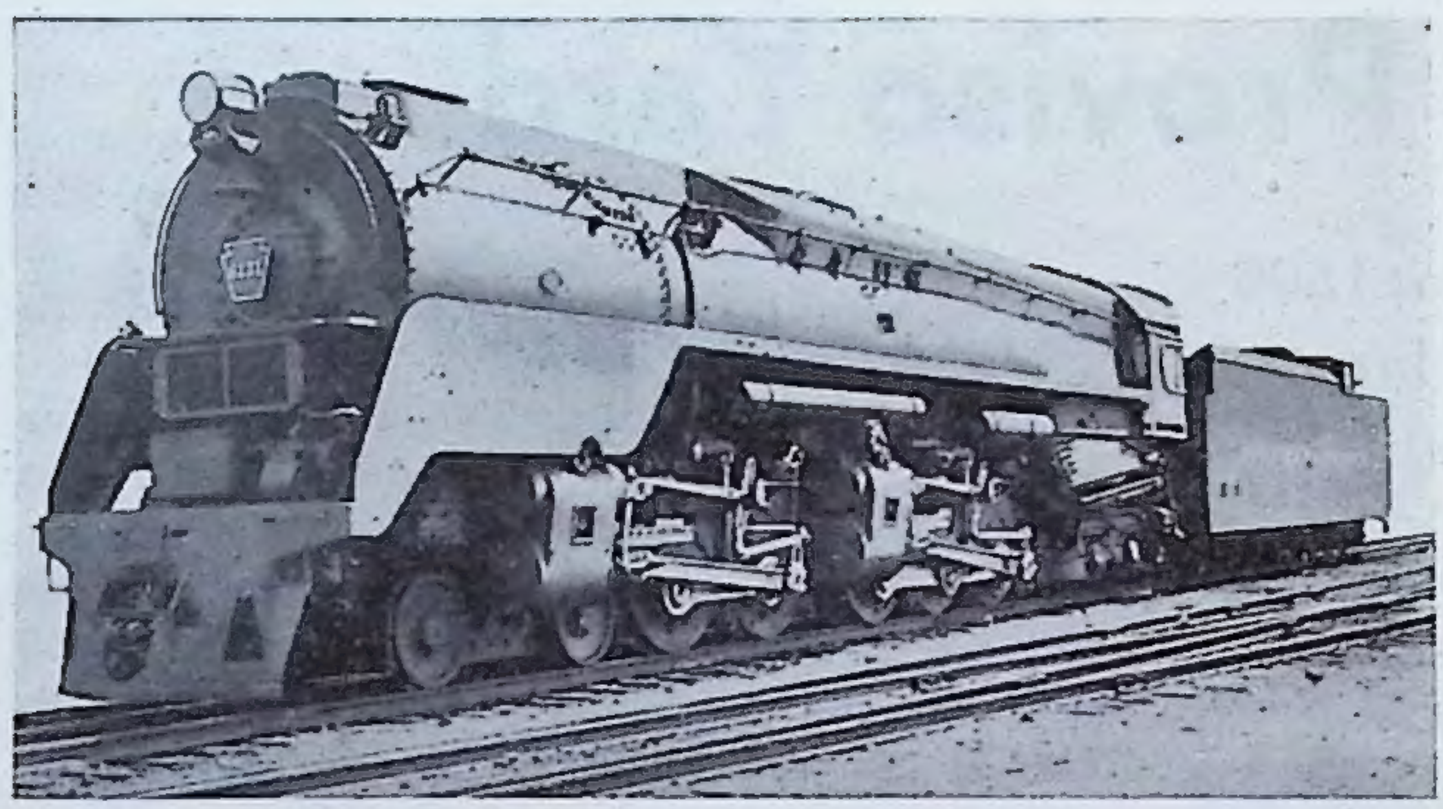
And that is very, very right. The cooperative operation of the American railroads, with interchange of cars practically everywhere on the continent, and with rates created by railroad and shipper cooperation to encourage the flow of traffic, is one of our present-day production miracles. It has, more than any other single factor, helped us toward winning the war.

### Train Telephone on Pennsy

Carrier-system train telephone will be applied to 245 miles of four-track main line between Harrisburg and Pittsburgh on the Pennsylvania Railroad. Thus the system worked out experimentally on the Bel-Del branch of the Pennsy will go to work expediting traffic on one of the busiest lines in the country. Approximately 300 locomotives, 90 cabooses, and six wayside towers will be equipped for two-way communication. This stretch of road is already protected by cab signal and automatic block, but the telephone system will keep the dispatcher more fully informed on operating conditions and will facilitate more efficient planning of train movements.

### Mexican Railway Sold

The Interoceanic Railway of Mexico, the Mexican Southern and the Mexican Eastern have been sold to the government-owned Mexican National Railways by British interests. All three roads had been operated for some time as part of the Mexican National system. Principal line involved is the narrow-gauge main stem between Mexico City and Vera Cruz. This competes with the partially electrified standard-gauge route of



Here is the first Pennsylvania Railroad Class Q-2 4-4-6-4 steam freight locomotive, of which 25 more are now being built at company shops in Altoona. Designed to pull 125-car freights at speeds in excess of 50 miles an hour, the new locomotive is said to develop more power at speeds greater than 20 miles an hour than any steam locomotive previously built. It has starting tractive power of 114,860 pounds with booster. Boiler pressure is 300 pounds. The other engines will be delivered late this year.

the privately owned (British) Mexican Railway Company. A comprehensive five-year-plan for the renovation of all railways in Mexico has been drawn up by the railway administration and the North American technical mission which has been in Mexico for some time.

### Postwar British Electrification

Further electrification of British railways is among postwar plans. Several projects for electric haulage of heavy freight and passenger trains were interrupted by the war and will be resumed, and extensions of existing electrification are being considered. More than 2000 miles of track is electrically operated, almost entirely in passenger service and mostly in the London suburban area, although some runs extend nearly 100 miles. In the London area the underground railways will be extended to link up with the suburban lines of the railways.

### St. Louis Anniversary

It is 50 years since St. Louis Union Station was opened. In 1894 it was the world's largest, and it still ranks high with 32 tracks under the original train shed and 10 alongside in the annex built in 1928. Sixteen railroads use this one station, more lines than use any other station. Cost of the original site, buildings and tracks was $6,500,000; improvements in the last 50 years cost $11,500,000.

### C. T. C. for the L&N

The Louisville & Nashville has ordered equipment from Union Switch & Signal for a centralized traffic control system on its 107-mile single-track line between Lebanon Junction, Ky., and Sinks. The control machine will be in the dispatcher's office at Louisville, 30 miles north of Lebanon Junction. This line is an important link in the L&N system, connecting the Louisville - New Orleans line and the Cincinnati - Atlanta line. Four passenger trains daily use the line, along with a sizable coal traffic from mines near the route and a heavy merchandise movement between Louisville and Atlanta.

### Locomotive Notes

The Baltimore & Ohio has ordered 10 more 2-8-8-4 articulated locomotives from Baldwin. These are to be duplicates of the 20 recently delivered (page 20). . . . The New York Central is trying its two freight Diesels between Elkhart, Ind., and West Springfield, Mass. . . . The Alton is buying five Diesel switchers from American Locomotive Company and one Diesel passenger engine from Electro-Motive Corporation.

### Odds and Ends

The Illinois Central has received and considered more than 100,000 suggestions from employees, and more than 15,000 of these have been adopted. . . . The Southern will build a Diesel locomotive repair shop at Alexandria, Va. . . . The Frisco has dropped joint operation (with the Katy) of the *Black Gold*, night train to Texas, and its own train, on revised schedule, brings Tulsa almost a day closer to Houston and half a day nearer to Dallas and Fort Worth. . . . A recently launched Liberty ship is named after Horatio Allen, designer of the *Best Friend of Charleston*, first steam locomotive built in the United States for regular service, and operator of the British-built *Stourbridge Lion*, first locomotive to run in this country.

A. C. *Kalmbach.*


## October, 1944

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# C&NW's Proviso Yard

## 230 miles of track within 1500 acres forms one of world's largest freight classification yards

A BRIEF

PROVISO YARD of the Chicago & North Western sprawls along the main line 13 miles west of Chicago, and is one of the largest freight classification yards in the world. It is a complete self-contained facility for the handling of freight, with its own roundhouse, rip tracks, locomotive repair facilities, an enormous freight transfer house, an electric car-retarder yard, an icing station, a car repair yard, and many miscellaneous facilities. The freight transfer house alone covers 21 acres and is 1420 feet long and 620 feet wide with a capacity under its roof for 720 cars. The entire yard includes 230 miles of track arranged over some 1500 acres. Special freight lines connect Proviso with C&NW divisions north and northwest of Chicago without going through the city.

Although Proviso is generally thought of as one yard, it is divided for efficient operation into nine separate yards arranged in a huge L five and one-half miles long and a half mile wide. The electric car-retarder yard uses gravity operation as in hump yards, but the ap-

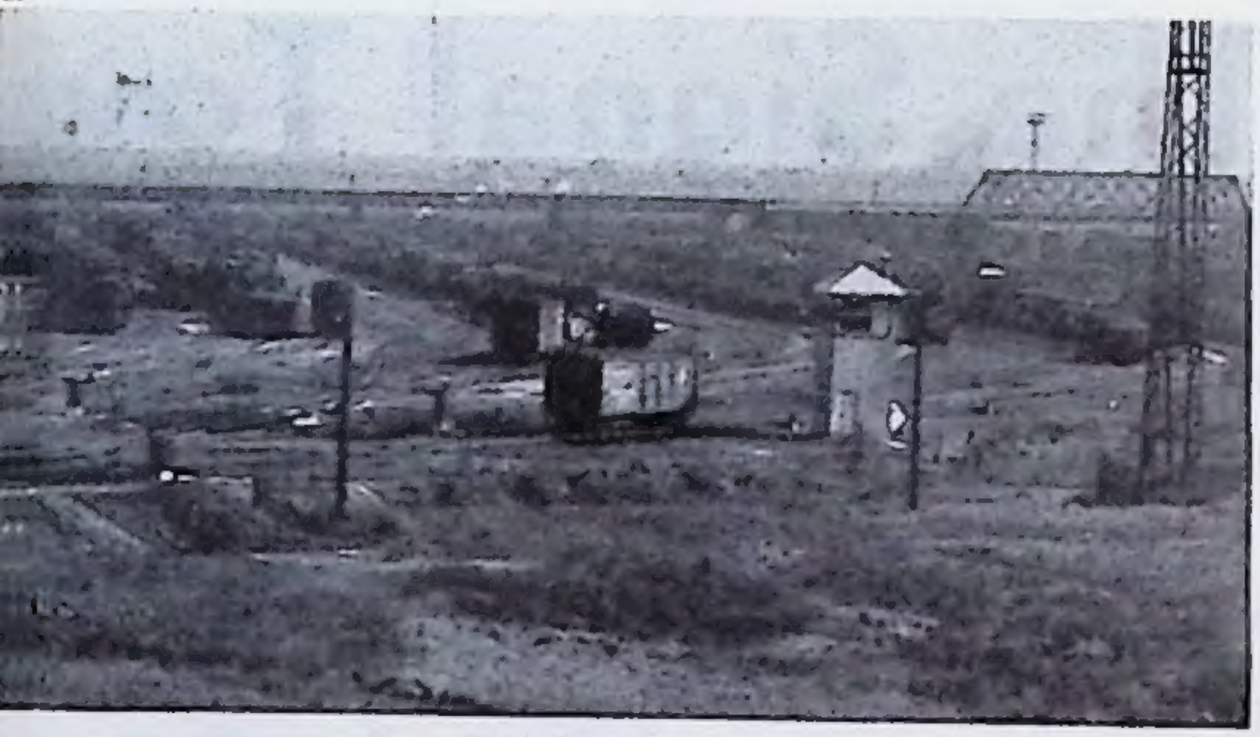
proach is level with a drop-off in the direction of the 59-track classification yard. The retarders are operated from three towers. So efficiently can the towermen control car speed that tests show cars are handled more gently in this yard than in the conventional flat switching yards. Trains of 150 cars and more are pushed over at one time at an average speed of about four miles per hour. The capacity of the 59 mile-long classification tracks is roughly 3300 cars.

At the present time an average of 2800 cars a day are being classified in the electric retarder yard, and the total handled in the yard averaged 7600 a day in October, 1942, the latest month for which figures are available. More than 70,000 tons of less-than-carload freight is handled daily in the freight house. All these average figures give no indication of the maximum amounts handled on extremely busy days. Proviso operates on a 24-hour sched-

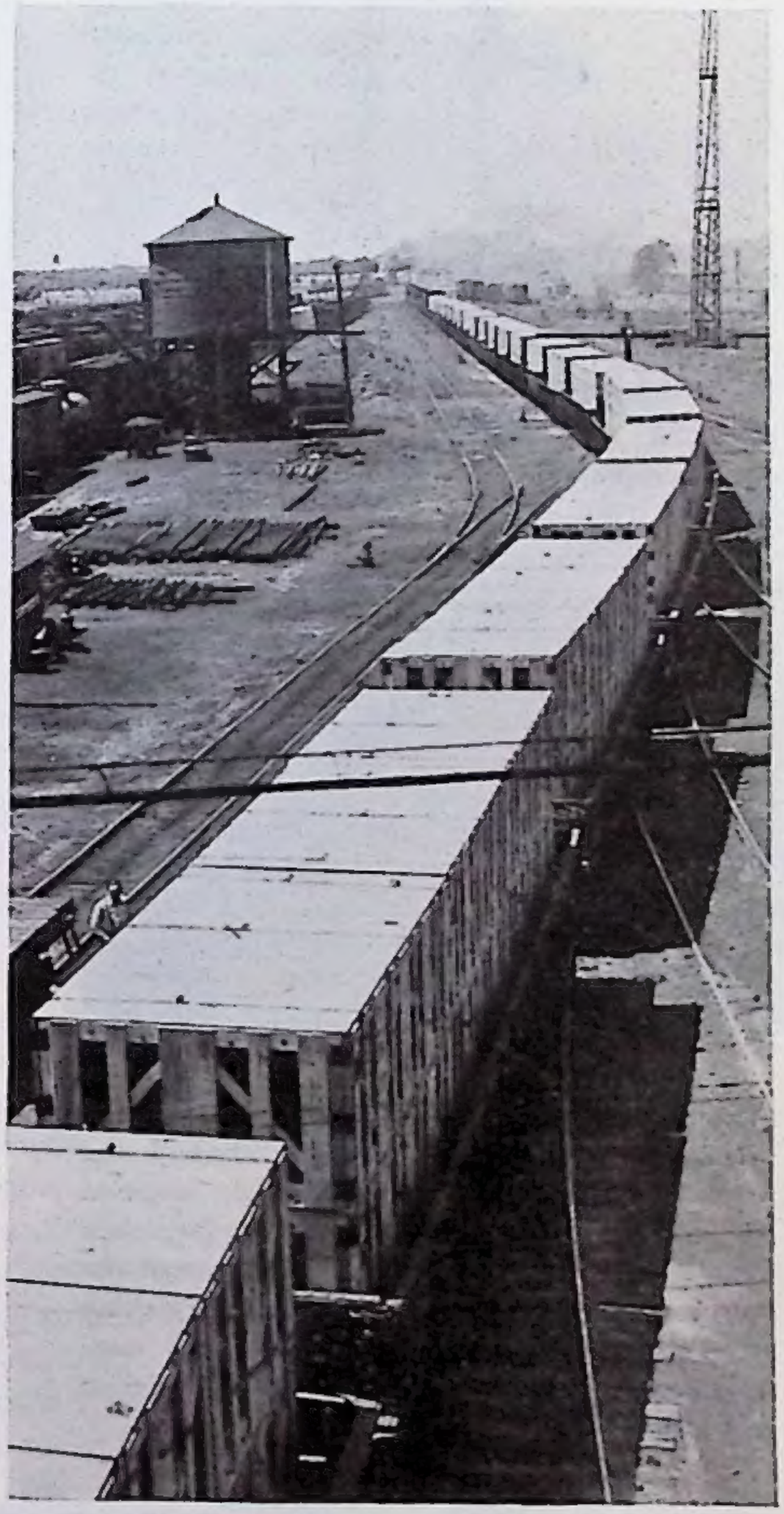
ule, and large floodlights on 75-foot towers illuminate large sections of the yard at night.

Originally, most of the area was swampland. The yard was built in 1927 at a cost of 16 million dollars. Slag from the Chicago steel mills was used to fill in the swamp and this has resulted in an excellent foundation. General Yardmaster Frank Krisch's office is in almost the exact center of the yard and contact is maintained with all sections by telephone, teletype and pneumatic tube. Nine yardmasters, 50 yard clerks and 50 switch and transfer engines are needed to handle the yard's business.

More than 40 years ago the North Western's principal yard in the Chicago area was at Crawford Avenue, nine miles to the east and in the built-up part of the city. Interchange freight to other railroads was delivered directly to the roads involved. As conditions changed it became more efficient to interchange freight by means of one of the belt or terminal lines, and so in 1903 a 2000-car interchange yard was built at Proviso, just west of the crossing of the Indiana Harbor - B&O Chicago Terminal belt line. This handled all the interchange freight of the Omaha line or Galena Division,



The electric car-retarder classification yard at Proviso is controlled from three towers shown in the above photo, taken from the upper end. The long viaducts carry principal roads across the yard, which is only one part of the huge Proviso facilities.



other freight still being handled in the city at Crawford Avenue. In 1910 the Des Plaines Valley cutoff was built, connecting Proviso with the Wisconsin lines of the North Western, and from that time on all interchange freight was handled at Proviso.

When, in 1921, it became apparent that increasing traffic was making the Crawford Avenue facilities obsolete, the North Western decided on expansion of the interchange yard at Proviso into its major Chicago freight terminal. The old inbound and outbound interchange yards were kept intact as hold yards and 200 miles of new track was added, together with 670 additional switches. Rail is 100-pound, ties are creosoted, and ballast is granulated slag.

Wayne Leeman, 1033 Bompart Ave., Webster Groves, Mo.

**Signals at the crest of Kirkwood Hill on the Missouri Pacific help direct trains through the maze of switches used to cut off helper engines. Top signals are for high-speed routes, then medium-speed, and the small semaphore at the bottom can call a train through the interlocking at a crawl. Below, modern NX panel controlling the Oakland end of the San Francisco Bay Bridge.**

# The Signal Tow

## Intricate interlocking machines help men route trains safely and quickly through railroad bottlenecks

THE OPERATION of a railway tower is one phase of railroading which seems to be but little understood—probably because but few have given to it any thought. Some, therefore, might like to know more about it, and the following is intended to be a not-too-technical explanation of how it is done.

Officially a tower is called a signal station or interlocking station, and together with the switches and signals which it controls it is called an interlocking plant. The word "interlocking" comes from the fact that all the switches and signals of the same plant (or sometimes adjacent plants) are so interlocked that "proceed" signal indications cannot be given for conflicting routes at the same time nor for opposing trains on the same route. The signals are also interlocked with the switches in such a way that a switch cannot be moved or even unlocked unless all signals governing moves through that switch are locked in the stop position. Similarly, a signal cannot be cleared unless some route (or perhaps, *the* route) which it governs has been properly lined and locked.

BY G. W. O'CONNOR

er

An additional protective device is provided which prevents the throwing of a switch under a train even though all signals governing moves through that switch are locked in the stop position.

Another matter which is taken care of mechanically is this:

It can readily be appreciated how bad it would be if a towerman could throw back a signal and lock it in front of a train for which it had been cleared, as he could then alter the switches in front of the train, which might not be able to stop and might therefore run through a switch which was in the process of being thrown or which was lined for a conflicting route; and this might easily lead to the derailment of the train or the breaking of the switch, or both. Then again, if the route could be changed in the above manner from a high-speed route to a medium- or low-speed route, the approaching train might not have time to slow down to a safe speed for the new line-up.

To take care of these conditions, the high- and medium-speed signals governing the various routes are so arranged that although they can be thrown back in the face of an approaching train they cannot be immediately locked. This permits the towerman to take care of any emergency which might require the signal indication to be changed from "proceed" to "stop," but since the signal cannot be locked immediately if a train is close, no routes can be altered immediately.

To alter a route under these conditions the towerman must first run down a time-release, and we cannot lock the signal until the "clock," as it is often called, has run down for a prescribed length of time. Low-speed signals, however, can usually be locked immediately after being put back to the stop position and the route altered, even in front of an approaching train. Care must be taken, nevertheless, when a train is close to such a signal, not to alter the route until the train has stopped.

When a time-release is operated, the appropriate signal immediately and automatically goes to the stop position, as otherwise a towerman could keep his time-releases always run down and would then be able to throw back his signals and lock them at any time, thereby defeating the purpose of the device.

## Optional routes

For the benefit of those who must travel but who cannot get accommodations by their usual route, TRAINS each month will print a brief listing and survey of available routes between larger cities.

Chicago and Kansas City:

*Alton*—Overnight train each way. Connecting local trains cover most of westbound trip, all of eastbound, in daylight.

*Burlington*—Overnight train each way.

*Chicago Great Western*—Overnight train each way on slower than competitive schedule and without sleeper for full westbound trip.

*Milwaukee Road*—Overnight train each way.

*Rock Island*—Day local and two overnight trains each way.

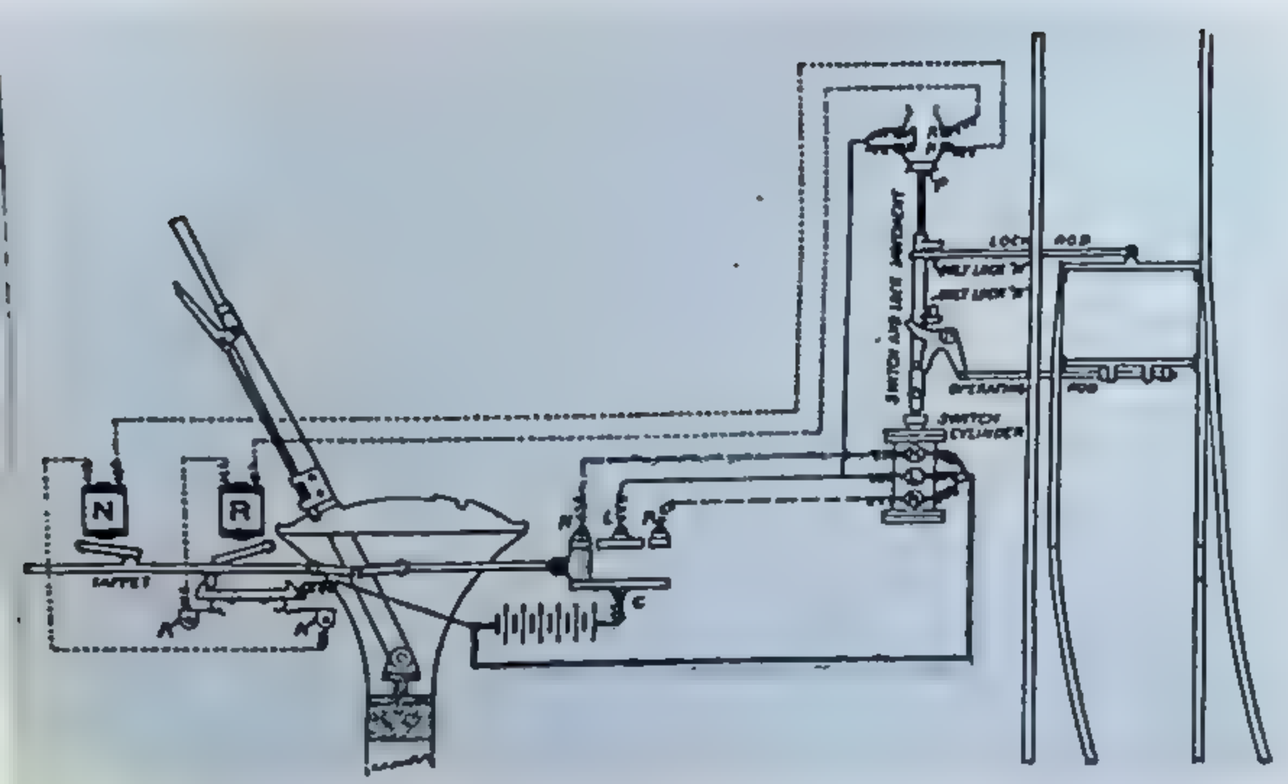
*Santa Fe*—Daytime streamlined and standard service. 3 overnight trains each way. Also several through coast trains at odd hours.

*Wabash*—Via St. Louis, using Chicago - St. Louis and St. Louis - Kansas City services.

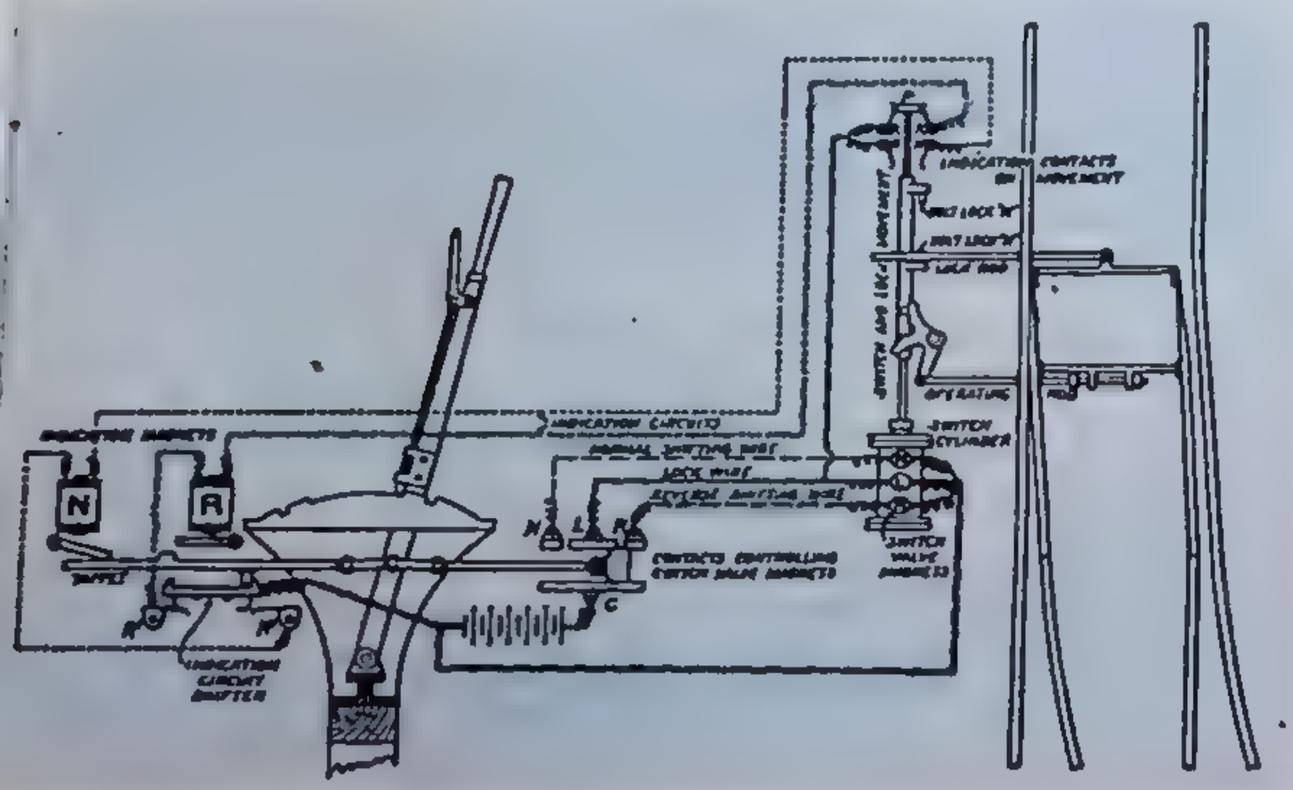
While a time-release is running down, an approaching train will usually have time to stop, but if it should be to close and overrun the signal, it at least will not run through any unlocked or improperly lined switches. It is bad practice to put back a signal in the face of a train unless absolutely necessary, as it may result in flattened wheels, upset dishes in the diner, drawbars pulled out, or even more serious accident due to the emergency stop which the train will make. In extreme cases the train may even buckle in the middle, causing a serious wreck.

All modern towers have what is called a "model board" or track diagram of the plant and the approaches from both (or all) directions. The tracks on this diagram are divided into sections corresponding to the track circuits, and these light up when occupied by a train so that the towerman can tell the locations of all trains on main tracks within sight of his signals or closely approaching them. (On some model boards the circuits are lighted *except* when occupied.) Switches and signals are shown on the board, and the numbers of the switch and signal levers correspond with the switch and signal numbers shown on the diagram.

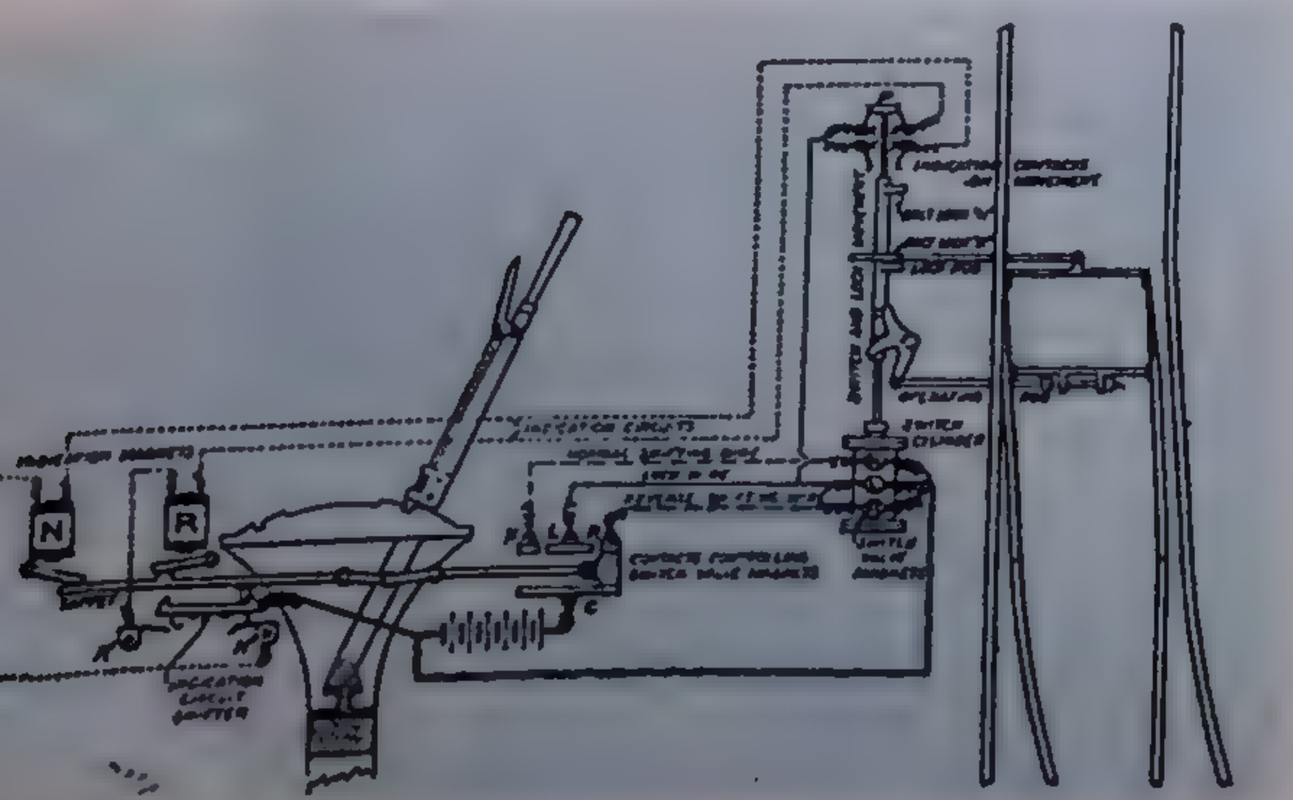
Both home and distant signals are shown, the home signals being those which directly govern the passage of a train through any route, and the distant signals being, as the name implies, signals some distance in approach to the home signals. These give the engineer of an



How an electropneumatic interlocking works. The lever and tappet locks are in the tower. In this, the N or normal position, electric current flows to the N valve on the air cylinder, keeping the switch in the normal position.



When the lever is first moved, the electric currents open the reverse valve on the air cylinder but the indication magnets will not allow the lever to be thrown all the way over until the switch itself has completed its throw and locked. Now the switch is in reverse position, and is safe to use.



approaching train advance indications of the positions in which he may expect to find the home signals.

Usually the home signals have an indication light close to the levers operating them, or else on the board. This light tells the operator when the signal is clear, as it does not follow that a signal actually clears when the operator moves the signal lever to clear it. The signal, on account of some defect, might fail to clear and the operator, without the indication, would not know that the signal had failed until there had been considerable delay. If he learns of a failure promptly he can get a maintainer after it at once and, if necessary, trains can be flagged by until the signal is again in order. (Incidentally, the first thing to look for when a signal fails to clear is a run-down time-release for that signal, which may have been used and then forgotten and left run down.)

When a train is flagged past a signal, the towerman must be most careful to know that all switches which the train will use are properly lined and locked, as he may have little or no automatic protection to tell him that it is safe for the train to proceed. Ordinarily, if the signal clears he knows that it is safe as far as the locking and lining of the switches are concerned. If for any reason a switch cannot be locked, it must be spiked before a train is allowed to pass through it.

It might be mentioned here that at some locations the comparatively new route-interlocking has been installed. Such interlockings are especially interesting because of the extraordinary speed and simplicity with which routes can be established. The control machine embodies a panel which is a miniature replica of the actual track layout. Representations of the switches and signals are included in the layout, and at the ends of each route is a push-button or miniature lever, or, more usually, a small combination push-pull-turn lever. In order to establish a route the operator or leverman correctly manipulates the lever or push-button at the points where it is desired for the train to enter and leave the route. If the route is unoccupied and otherwise available, all the switches will automatically operate to the correct positions and the signals governing movements over the route will display the correct aspect for the intended movement. All the basic safety principles of interlockings are retained so that it is impossible to set up conflicting routes, move switches under a train, or other-

wise cause an unsafe condition. Full indication is provided to show the positions of the switches and signals, to announce the approach of a train, to indicate when the route is lined up, and also to inform the operator of the progress of a train through the interlocking. Such interlockings go by the names of "NX," signifying Entrance-Exit, or "UR," meaning Union Route interlocking.

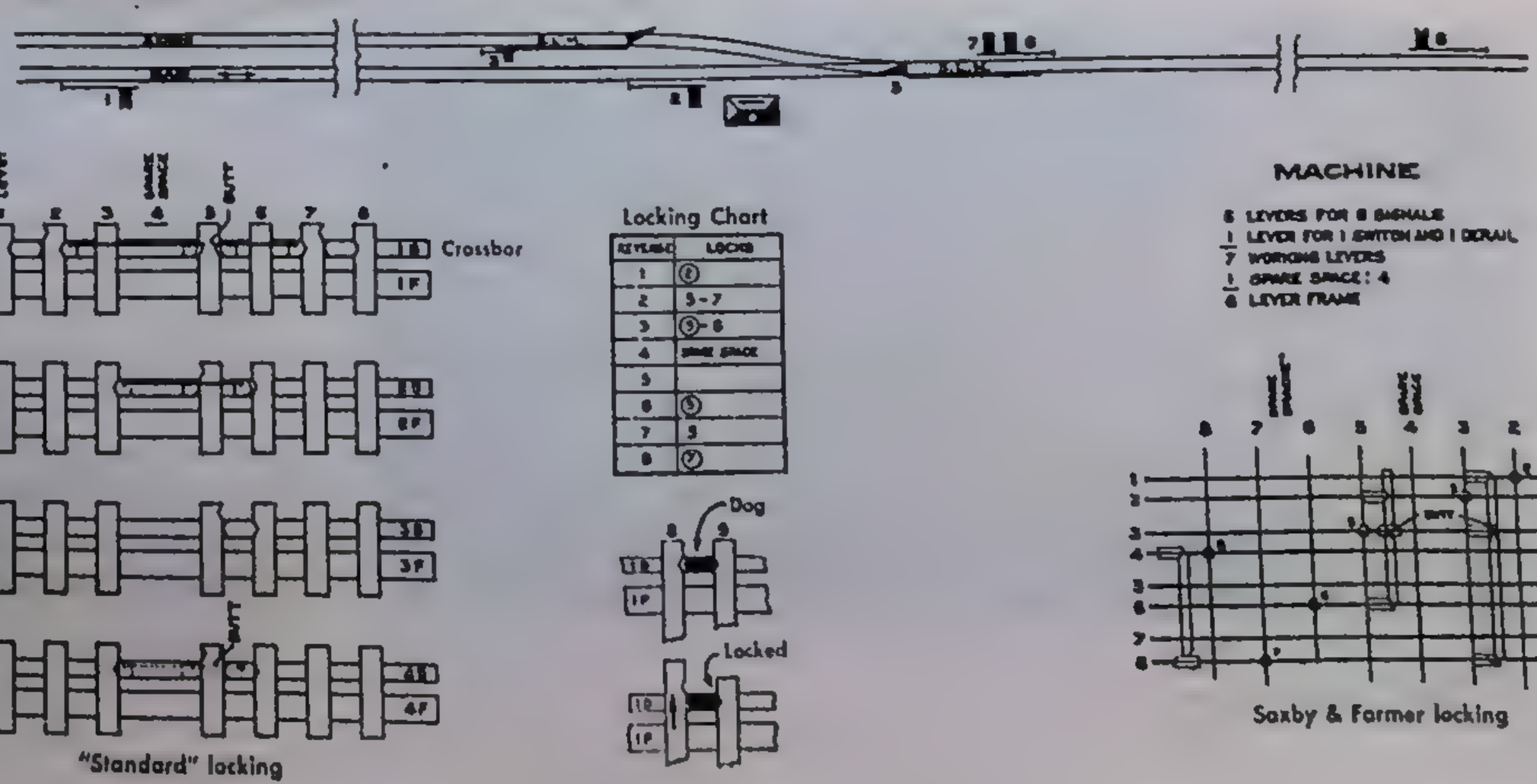
Union Switch & Signal Co.

Where only one man operates a tower, he is called either a towerman or an operator. In busy towers, where additional men are used, the operator is the one who keeps in touch with the dispatcher and directs the moves in the tower, while the ones operating the machine are called levermen. In very large plants the man in charge may be called a train director.

When it is necessary for an operator to have information about approaching trains which have not yet "hit" on his model board, he can consult either the dispatcher or an adjacent tower by telephone or telegraph, as the case may be. By the same means he is notified of extra trains or sections, or when regular trains are coming to him on other than their regular tracks or in other than their regular order. Regular moves are obtained from the employees' timetable, and the operator usually assumes that all moves are regular unless he is notified to the contrary.

When a signal is cleared for a route, the towerman, in some towers, does not have to know whether the proper signal should be high-, medium-, or low-speed. That is taken care of automatically in accordance with the way the track is lined. The distant signal also assumes the proper position, whether it is controlled by the same lever as the home signal or by a separate one. In other towers a

At an interlocking plant each signal, switch, and derail has a number, and a lever is assigned to it. A table is prepared showing which levers should be locked when certain other levers are pulled. For instance, if signals 2 and 1 are cleared, switch 5 and all other signals should be locked. "Standard" and S&F locking arrangements are shown at the right and left, below. They work on the principle of a dog that can slide laterally into a notch in the lever to lock it when another lever is pulled, as at bottom center.



different home signal lever is used for each of the different routes, but only the proper one can be moved to clear the signal—again in accordance with the way the route is lined.

Although the signals take the proper positions in accordance with the route, it should be mentioned that in automatic signal territory the signals of an interlocking plant are a part of the automatic block system, and if a towerman attempts to clear a signal immediately in back of a train the lever may move but the signal will not clear until the train moves out of the block, when the signal will automatically go to the proper aspect.

Usually, before working in any particular tower, the towerman writes out what he calls a "dope sheet," giving the numbers, times and tracks of all regular trains in the order of their scheduled appearance at that tower. Perhaps other information regarding certain trains may also be added. The towerman does not need to make out this sheet daily but only on the first day, as it will serve until there is a change of timetable. Each tower keeps a record of the times of passing trains, the tracks used and sometimes the engine numbers and other information. Like the dope sheet, this record of trains is kept in the order of their appearance, but it seldom agrees with the dope sheet for any long period. In order for the two sheets to agree, all trains must be on time on their assigned tracks, and there must be no extra trains. The block record, as it is called, is used for reporting trains to the dispatcher and, in manual block operation, for checking which trains have cleared and which are still in the block. It also shows, in manual block operation, how the trains were admitted to the block (clear signal, train order, instructions from the operator, etc.) and when cleared and by whom (the conductor or the operator at the far end of the block). The record is also used for checking any moves as to how they were made and as to how they might have been improved.

Relays take a considerable space on the ground floor of many towers. Glass keeps dust away.

When an operator reports for duty, he receives from the man going off duty a "transfer" of all train orders then in effect and all conditions which may affect his work, such as certain trains late, a work train coming with certain moves to make, or any unusual condition. He then takes over.

An operator who is not working one tower regularly and is therefore not so familiar with the trains must work from his dope sheet—or if he hasn't any, then from the timetable—which he consults to see how the trains are coming to him, which ones make crossover moves or turnouts, and which go straight. If any trains are scheduled to drop or pick up cars at his station, he must also have information concerning this.

Let us imagine that we are running a main-line tower where there are four tracks, and the crossovers are so arranged that moves can be made from any track to any other track without backing. We shall see what goes on.

The dispatcher's phone bell rings and we answer with the name or number of our tower, or perhaps the call letters.

"No. 20 will be on 2. Put him to 4," says the dispatcher. This means that No. 20 must go to Track 4 ahead of anything else that may come to us on Track 4.

We consult our block record to see what has gone and our dope sheet to see what is coming, and we find that No. 20 will be the next eastbound train. We put back and lock the signals on both 2 and 4 tracks, since both of these signals govern moves through the crossover to be used. Then, after setting up the route from 2 to 4, we clear the signal on 2. (We could not clear it on 4, as after the crossover is thrown that would be a conflicting route and the locking, either mechanical or circuit, would prevent clearing the signal.)

The dispatcher's bell rings again.

"A special will follow No. 20 on 2. Let him go straight."

The information about No. 20 "coming 2" and the special following will probably also be given us by the next tower in the direction from which the trains are approaching;

and we will pass word along to other operators on the line.

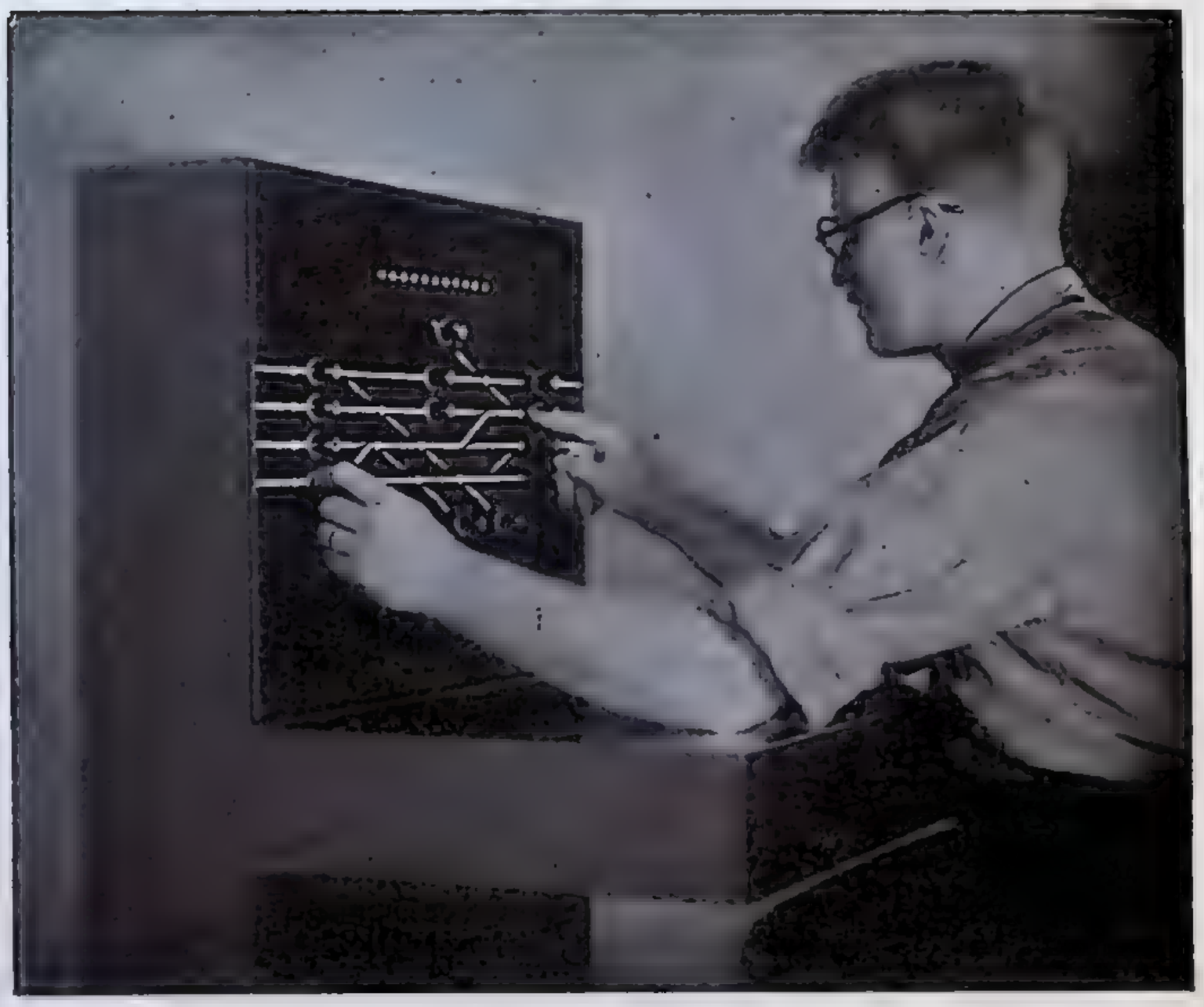
Before long No. 20 goes by, crossing over from 2 to 4. We must get the signal locked in the stop position behind him before we can straighten up the iron for the special—but the special "hits" (that is, appears on our model board) before we can get the signal locked.

Now, some signals are equipped with what is called an overlap which permits an operator to get his "back lock" while a train is passing the signal. This is safe because a following train will not get any changes in signal aspect from a more favorable to a less favorable one. If our signal is not so equipped we must "grind off" (meaning to run down the time-release) before we can change the route for the special.

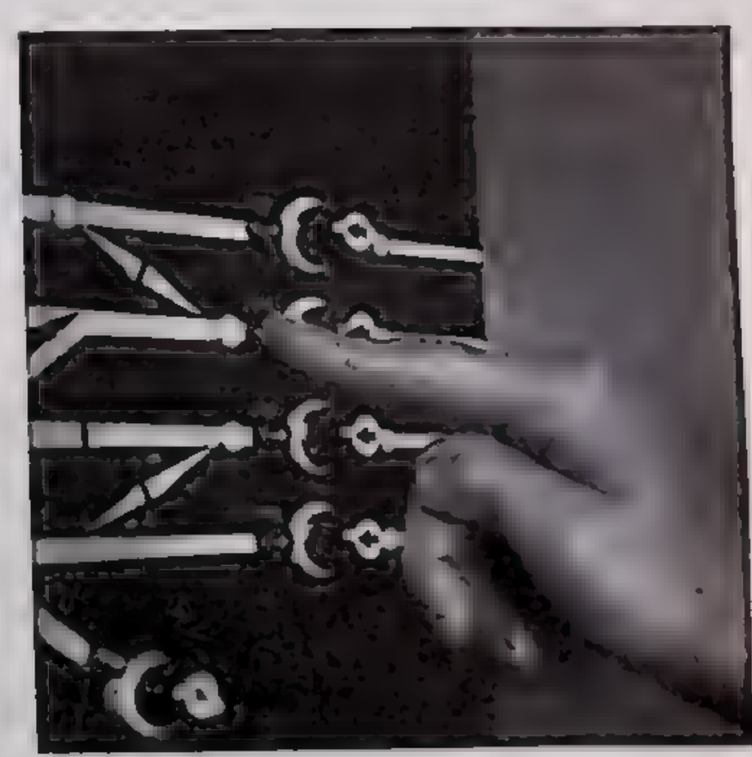
As soon as convenient we report to the train dispatcher the times of the train and the tracks used. This report is called an OS.

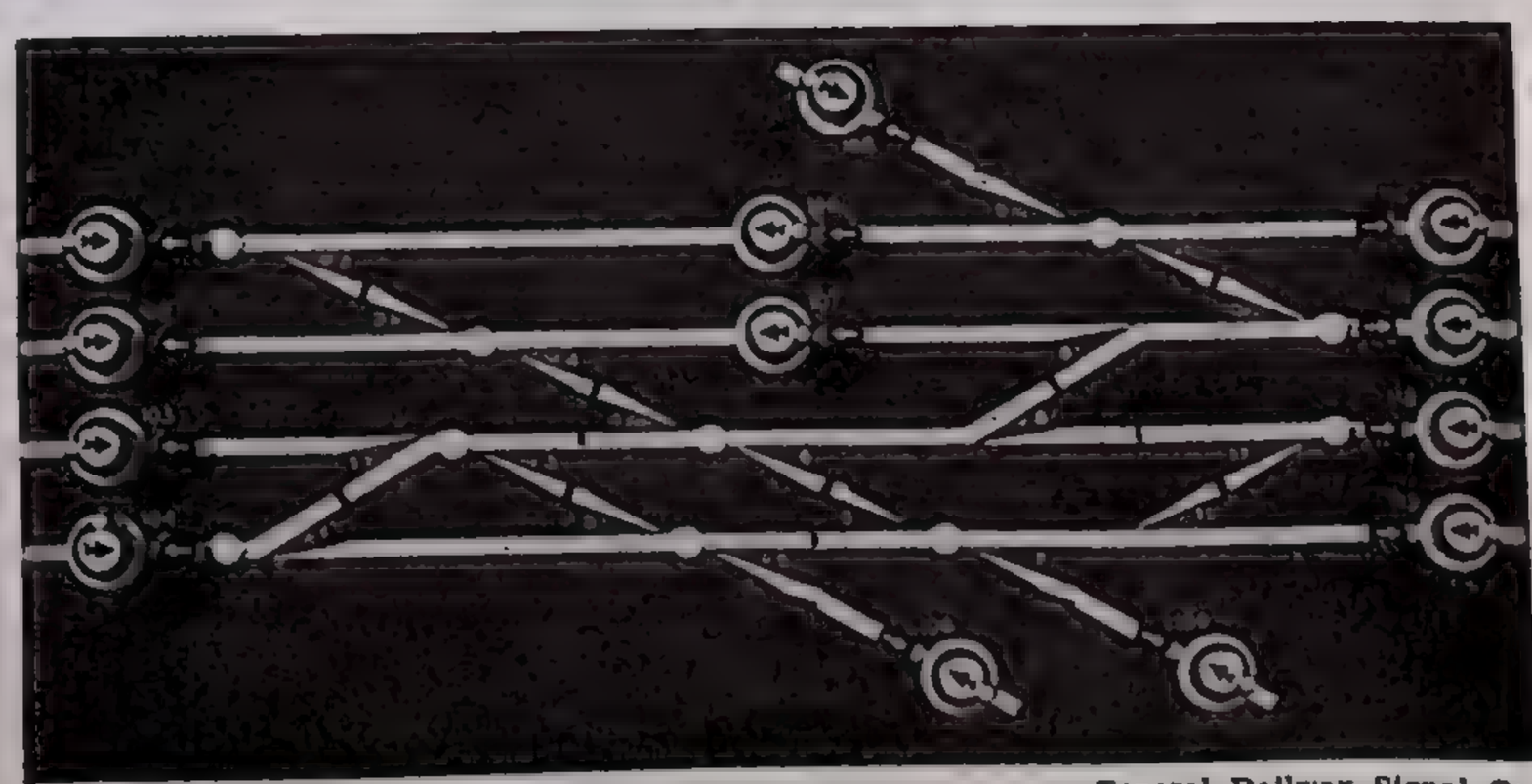
For the next half hour or so perhaps everything runs straight both east and west, and all we have to do is to note the times on the block record and give the OS. The time used for any train is the time when the rear of the train passes the tower. This time is used rather than the head-end time because the block is not clear until the rear of the train passes out of it.

When trains come to us on other than their scheduled tracks, we let them go straight unless other-



The NX machine is easy to use and takes very little space. To set up a route the operator first turns or pushes an entrance button for the track from which a train is to enter the interlocking. Then he pushes the exit button. As soon as a clear route is available the machine automatically sets up all the switches and clears for the train. When there is a choice of routes and one is occupied the machine will choose the other.





General Railway Signal Co.

wise instructed by the dispatcher, merely passing word along to the next tower so that the operator will know what train it is and therefore what to do with it. Probably the dispatcher will also tell him.

Next, the tower to the east of us tells us that NG-5, a westbound freight, has a hotbox about 48 cars from the caboose. (The dispatcher, of course, knows how many cars are in the train and can therefore tell how many that would be from the head end, or how "deep," as they say.) When a hot box is announced it means that the train must be stopped, so before he hits we put back and lock our signal on NG-5's track, which we will imagine to be Track 1, the westbound middle track. The dispatcher also tells us to stop NG-5. Had NG-5 been too close when we received word about the hot box, we would have left the signal clear and given him a stop sign as he passed the tower, at the same time giving the hot box sign. He would then pull clear of the crossovers before he stopped. In a few minutes the train stops at the home signal and in another few minutes the local phone rings.

"NG-5—What are you holding us for?" It may be the conductor at the rear end of the train or the head-end brakeman. We tell him the trouble and he starts out to find and inspect it. There is still hope that they may be able to fix it. Probably the man at the other end of the train will also call in. It may be some time before we hear from them again. At last the phone rings.

"We have to set it out," they say.

"O.K. Stay on the phone till we see what the dispatcher wants to do."

There may be several ways in which a deep hot box can be set out. If there is a switch engine nearby which can be called upon, it is possible to cut the train just ahead of the hot box and let the head end pull down far enough to clear our signals so as to let the switch engine in to get the hot box, after which the head end is backed onto its train again. If no switch engine is available, the cut will probably be made just behind the hot box, which will be pulled clear of our signals and then backed over to Track 2—the eastbound middle track—when traffic permits. It will be left there while the rest of the train is coupled together again. Then the engine alone is uncoupled and leaves the train on Track 1 while it goes over to Track 2, picks up the hot box and sets it out in whatever siding is best suited to the purpose, depending upon local conditions and traffic. This is safer and quicker than trying to handle it on the end of a long train, especially if it has to back into a siding where there is danger of hitting the bumping block or running off the end of the track, which might occur because of poor vision, possible curves, and so forth.

After setting out the hot box, the engine goes back on its train and is ready to go as soon as it pumps up the air, which requires up to five minutes or so, depending upon the length of the train and how long it has been uncoupled from the engine, as well as on other conditions. The dispatcher is consulted, and when he says to let it go we "give it the board." The engineer blows his whistle five long blasts (four blasts, if an eastbound train) to call the flagman in; and after giving him time to come in the engineer blows two short blasts and starts off. The whole operation of setting out a hot box may take an hour or more, as it has to be sandwiched in between the moves of regular trains and other freights or specials. Or if everything is in our favor, 15 minutes may be enough to complete the maneuver.

Even on a four-track line it may be necessary occasionally to run a train against the current of traffic—that is, on a track where the normal

This is the scene that confronts the operator of one of the towers at Washington Union Station. The operator gets most of his information from the illuminated track diagram and by phone from the station and other towers.

Pennsylvania Railroad.

Pennsylvania Railroad.

Above is the large interlocking machine used at the west end of Pennsylvania Station, New York City. Besides levermen there are a train director and a regular staff of operators. This picture was made years ago and many changes have been made since. Below, the locking bed for another machine. Mechanical locking such as this is being superseded by all-electric locking through relays on most new interlockings.

direction of traffic is in the direction opposite to that in which the train is traveling. Such a move, unless the track to be used is equipped with signals for two-way operation, must be made only under the direction of a train order addressed by the dispatcher to the "C. & E." (conductor and engineer) of the train which is to make the move, and to the operators at the ends of the portion of track to be used.

Such orders are dictated by the dispatcher to the operators who will control the move to be made. The operator where the train will enter the portion of track to be used will usually make three copies of the order and will hand up one copy to the engineer and one to the conductor of the train addressed, as it passes his tower. This is done by fastening the order to a hoop, of which there are several on hand in each tower. The operator stands beside the track and holds up the hoop where the engi-

Union Switch & Signal Co.

neer (or fireman) can put his arm through it. Then he does the same with another hoop for the conductor. Those receiving the order immediately detach it from the hoop and throw the hoop off so that it can be used over again.

With the order (or orders) a "clearance card" is always given stating the number of orders being delivered and the order number of each. This helps to guard against the possibility of not giving a train all the orders it is supposed to receive. The clearance card also indicates the condition of the block to which the train is being admitted—whether clear or occupied. The towerman must obtain this information by checking with the man at the far end of the block, as he will know whether all trains which have been reported into the block have passed out of the block.

In giving an order to a train, if the order is one which restricts its rights, the train must be brought to a stop before the order is delivered. Sometimes the conductor and engineer must sign for such orders. On the other hand, those orders which confer rights may be handed up on the hoop as the train passes. They require no signatures and the train will only have to slow down, not stop.

Before dictating an order authorizing a move against the current of traffic, the dispatcher checks with the operators to see that the portion of track to be used has been cleared of opposing trains. The operator at the point where traffic normally enters that portion of the track must then hold all trains from entering it until the train moving against the current of traffic has passed.

After the move authorized by a train order has been completed, the dispatcher, on some roads, will issue an order annulling the first.

And so, in our imaginary tower, normal business continues—with variations, perhaps—until our tour of duty has expired.

Those who might like to try this work have a golden opportunity on account of the manpower shortage, though it is not probable that they can hold their jobs very long after the war is over. There are few better ways in which they can serve our country.

**An interlocked crossing of NYC over PRR at Columbus, O. Notice home signal above horizon.**

Glenn Grabill Jr., Railroad Photographic Club, 47 Royal St., Allston, M

General Railway Signal Co.

To operate a network of switches like these at Toronto would be nearly impossible with a crew of hand switchmen. The modern machine below handles the throat with a crew of two levermen and train director. Space is saved by having alternate levers in the upper position. Spare spaces are left all along the machine to accommodate added tracks.

General Railway Signal Co.

# Baltimore & Ohio 2-8-8-4 Articulated

TWENTY new 2-8-8-4 articulated locomotives, built by Baldwin and delivered this spring, are working heavy fast freight trains over historic Seventeen-Mile Grade by which Baltimore & Ohio climbs the Alleghenies west of Cumberland. This is on its line between the East and Cincinnati and St. Louis. These locomotives are similar to but not as heavy nor powerful as engines of the same wheel arrangement built in recent years for Duluth, Missabe & Iron Range and Southern Pacific. The SP's 3800 series Lima-built 2-8-8-4's, used on the Sunset Route, have 124,300 pounds tractive effort, and the DM&IR engines, which have seen off-season rental service on the Rio Grande, are rated at 140,000 pounds. Similarity should also be noted to SP's 4200-series cab-forward articulateds, listed as 4-8-8-2's but actually 2-8-8-4's, which are run with the firebox end in front.

## Specifications:

| | |
|---|---|
| Road classification | EM-1 |
| Road numbers | 7600–7619 |
| Tractive effort, lbs. | 115,000 |
| Cylinder diameter and stroke, in. | 24x32 |
| Driver diameter, in. | 64 |
| Weight on leading truck, lbs. | 50,700 |
| Weight on drivers, lbs. | 485,000 |
| Weight on trailing truck, lbs. | 93,000 |
| Weight of engine, lbs. | 628,700 |
| Weight of tender, lbs. | 382,000 |
| Boiler pressure, lbs. | 235 |
| Grate area, sq. ft. | 117.5 |
| Evaporative heating surface, sq. ft. | 5298 |
| Superheating surface, sq. ft. | 2118 |
| Tender capacity: Gallons of water | 22,000 |
| Tons of coal | 25 |

# Case History

## Railroads have the right to demand good conduct on part of passengers, court decides in historic B&O case

BY ATTORNEY LOUIS F. MEYER, JR.

CAIN was raising Cain.

Richard W. Cain and three convivial companions had just striven mightily with John Barleycorn and were still packing a fragrant bottled ration. Seeing the world through wine-colored glasses, they passed the bottle, swapped lusty tales of derring-do and slapped backs, all in the special "ladies' car" of the train upon which they were returning to Washington City from a revival camp meeting at Washington Grove.

The elders among us will recall when the fragile sex, aided and abetted by wasp-waisted iron maiden corsets, were counted upon to faint of shock at the first sign of profanity or the least glow of ribaldry. Picture, then, the confused, horrified huddles and sharp indrawn breaths of disapproval from the ladies just returned from meetin' on this August Sunday, 1892.

Into this scene, summoned by the frustrated brakie, strode Conductor Gaither, schooled in the B&O tradition of uniform courtesy. Brass Buttons represented the majesty of outraged society. His insistence fell upon stony soil as the blotto quartet asserted that variety of personal liberty which is best magnified through bottle bottoms.

"Whaddya gonna do about it?"

The ladies withdrew to the forward car while male spectators twirled handlebars and chafed to enter the fray. The Cap'n, mindful of public relations and his numerical inferiority, retired to strategize, pelted with purple penultimates as he went. The revelers roared on.

At Forest Grove the conductor wired ahead to Washington for a bluecoat reception committee to welcome the fuddled foursome, and identified them to the police upon arrival. In the hands of the receivers, so to speak, they languished until tried and fined by the police magistrate on Blue Monday.

Esteeming himself abused, Cain retained counsel, who forthwith slapped a "suppeeny" on the railroad, alleging wrongful arrest. Cannily-counseled Cain demanded and received a jury trial, during which his attorney drew and played upon all the stops of the organ of oratory. The fearful disgrace visited upon Cain was described as disproportionate to his simple misdemeanor. Only a goodly poultice of cash could draw his nagging pain.

Poor man *versus* rich corporation. Jury. Verdict, $758 for the poor man.

John K. Cowen, then general counsel and later president of the B&O, couldn't swallow this verdict. The railroad dragged the whole sorry recital before the Court of Appeals, where the tender mercies of juries are treated to the cold surgery of the law. In the rarified atmosphere of this supreme state court it was argued for Cain that the company held no right to exclude a ticketholder from any one car in a train for conduct permissible in another coach. Such a rule was exposed as the merest caprice.

On the contrary, contended the B&O, it was within the powers of the road to prescribe reasonable rules of conduct for its passengers, which they violate on penalty of arrest or ejection. An aura of piety surrounded railroad counsel as he stressed the duty of the company to protect its fair passengers from the loutish acts of the intellectually underprivileged. Did not the company owe even to Cain the duty to protect him from his elated self? What is unreasonable about restricting nicotians from converting cars into smokehouses, or about establishing separate facilities for the modest voyager?

The appeal judges soundly trounced Bro. C. in their opinion. His conduct was described as shocking to the chaste conscience of the court. Cap'n Gaither's action was confirmed in every detail, and his employer was commended for public-spirited discharge of duty. To permit Cain cash for the Cap'n's preservation of decency was unthinkable!

★ **Railroads have the power to demand of passengers a standard of personal conduct which meets social acceptance in the restricted space and limited privacy of railway cars. Actions or words offensive to fellow-travelers are not among the privileges purchased with a ticket for passage, and employees are charged with the duty of maintaining order.**

**To preserve travel safety and the comfort of special classes of passengers a railroad may prescribe reasonable rules to which a passenger, by purchasing a ticket, assents. Smoking and the inhalation of strong waters may be restricted to special cars or sections of a train. Space may be reserved for certain categories of patrons, as witness the "ladies' cars" where the lone female seeks surcease from the howl of the wolf, installs curlers in her hair and, cloistered from male intrusion, forgets that she is "a big girl now." Travelers may be prohibited from placing themselves in situations of danger on platforms and steps, or by draping themselves out of windows.**

**Disturbing the mobile peace renders the offender liable to detention by employees and arrest at the most convenient point of police contact. Or, as is the case with the violation of reasonable or necessary rules, the violator may be ejected from the train before reaching his destination. Employees may not use unnecessary violence in removing the offender, nor may they set him down in a place of peril, but he can be ejected without reference to his wishes, convenience or comfort.**

A K-4 speeds its train near Rahway, N. J., before electrification of the Pennsy's New York Div

Anthony P. Formanek, Railroad Photographic Club, 47 Royal St., Allston, Mass.

on.

# Invasion Railroads

**TOLD IN PHOTOGRAPHS JUST RELEASED BY SIGNAL CORPS**

RAILROADS played an important part in the invasions of Africa and Italy, and now they are playing an equally important part in the invasion of France. Trains consist almost entirely of freight and hospital cars, troops and munitions being moved almost exclusively in freight cars. Railway battalions follow advancing units and set up railroad facilities section by section as rapidly as possible. The main objective is to get a track laid and a train running regardless of whether the gizzard will be shaken out of some high-ranking officer. Where a bridge is destroyed, for instance, a temporary "shoo-fly" is laid to by-pass the bridge site. Trains creep along the shoo-fly until the bridge is rebuilt. The whole object is to get trains moving, even if only at a snail's pace. We use every bit of French equipment that can be found, even if it must be held together with shingle nails and barbed wire. On the four main east-west double-track French systems the technique is to get a single track going, using salvaged parts from both old tracks. French railway personnel is used where possible, but usually all railway men have been shipped out of invasion territory by the Germans. Army men working on the railroad wear fatigue clothes or coveralls. In the general invasion scheme the railroads are responsible for all long, heavy hauls.

**The Army officer above is looking down at a rail yard in a supply depot somewhere in the British Isles. Locomotives are being checked before being put in storage for invasion use. The Frenchman at upper right is decorating the pilot of an American-operated engine with flowers. The reconditioned French locomotive at the right has been christened the "Broadway Limited" as seen by the chalk lettering on the smokebox front. It is coupling to a hospital train.**

Most of the oil for Diesel switchers as well as coal for steam locomotives must be brought along by the invasion forces. The Germans either take along or destroy fuel stores wherever possible, although 300 tons of coal was found in Rome. The huge crane below is unloading an American Locomotive Company engine at a foreign port. At right an army repair crew is looking over damage to a French locomotive. The train at lower right is an ambulance train to Cherbourg made up of box cars left behind by the Germans.

A train operated by an Army railroad battalion is shown leaving Cherbourg station July 28 on a regularly scheduled run. It carries Allied soldiers and French civilians. The scene below indicates the track repair job which was done at Cherbourg before railroad service was possible. French civilians and American soldiers are working together on the track at Lison on the way to Cherbourg.

The German rocket planes launched against England were just as dependent on railroad transportation as are our own armies. Under camouflage nets a narrow-gauge train (above) operates at the entrance to the supply base and launching area of the rockets. Notice the standard-gauge track in back of the narrow-gauge. The locomotive below was brought over to France in 1917 and is still in use.

# The North Shore Line

A PHOTO NARRATIVE

## Chicago North Shore & Milwaukee electric line handles both freight and passenger traffic

IN ALL the world there is no other railroad quite like the North Shore Line. Unique in its combination of interurban, heavy electric railroad and rapid-transit characteristics, the road handles passenger business between Chicago and Milwaukee, a heavy commutation traffic between the lake-shore suburbs and Chicago, and a freight business which includes the movement of truck semi-trailers between Chicago and Milwaukee on special flat cars.

The Chicago end of the road uses the elevated tracks of the Chicago Rapid Transit and the principal station is at Adams and Wabash on the busy Loop. The Milwaukee end of the line is an impressively up-to-date brick station with stub-end high platforms and umbrella sheds, reached over 2.8 miles of city street used also by nickel-fare four-wheel Birneys for local streetcar service. The mainline route includes not only the high-speed Skokie Valley Line, built in 1926, where limited trains can run more than 16 miles with the controller wide open, but the original Shore Line route, finished in 1908 and now used only for suburban service, with trains running across or on streets through many medium-sized communities.

Skokie Valley Route.

To best see the North Shore, ride Chicago to Milwaukee on one of the two three-year-old *Electroliners* which leave the Chicago Loop at 8 and 11 a. m., 2, 5 and 8 p. m. Get the front seat, right up next to the

George Krambles.

North Shore Line's Chicago terminal arrangements combine passenger convenience and low cost, for the road uses trackage rights on the rapid-transit elevated, stopping at principal stations and offering free transfer to all others. Lake and Wells tower (above) was the world's busiest railroad crossing until the new subway removed some traffic. The train at far right is operating by third rail on the Skokie Valley Line just north of the Chicago city limits.

Charles A. Brown, from Krambles collection

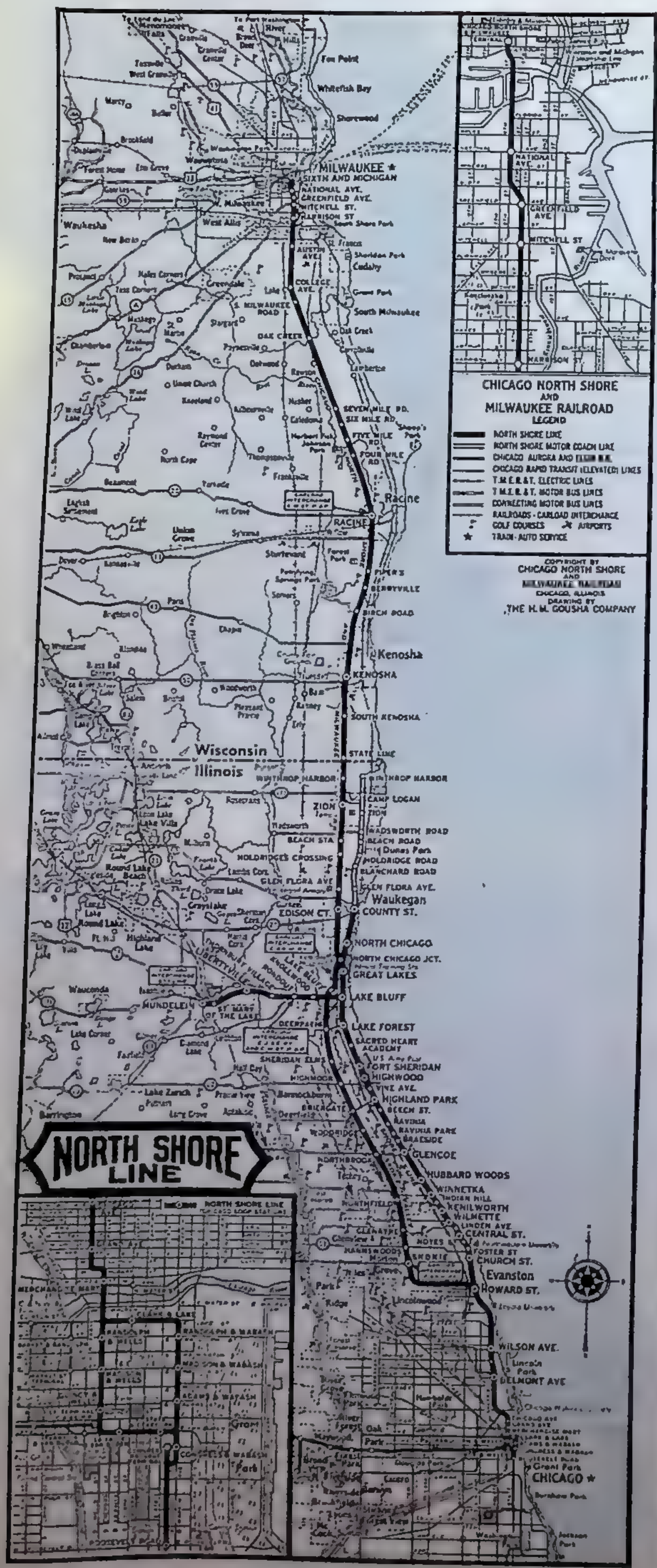
George Krambles, Central Electric Railfans' Association, 1240 Edison Bldg., Chicago, Ill.
**Frequent service helps keep the line open even in the worst weather.**

motorman, by catching the train at the Roosevelt Road station, south of the Loop. Here North Shore trains originate and here, between trips, cars are stored in the center of three elevated tracks.

The *Electroliner* is a spectacularly different-looking piece of equipment, but don't stop to inspect it now. Grab that front seat quickly. Very quietly and with a quick, smooth sure-footedness the train threads the sharp curves into and out of the Loop, stopping at the Rapid Transit stations to pick up passengers bound for North Chicago Junction, Waukegan, Kenosha, Racine and Milwaukee. Both acceleration and braking are unusually fast and in spite of the many curves on the elevated, the *Electroliner* gets up to pretty good speed on the straight stretches, especially on Chicago's North Side beyond Wilson Avenue, where elevated tracks are on solid fill, with gradual curves sharply banked.

George Krambles.

Except in the Loop, where all trains run counterclockwise on a double-track line, most of the L route is four tracks. Both local and express elevated trains are frequently passed, as well as North Shore trains in the opposite direction. Many passengers board the




Courtesy North Shore Line.

train at North Shore's three far north side stations. One of the line's potent selling points is that passengers to and from Chicago's North Side can use conveniently near stations instead of going all the way to the Loop.

Howard Street, last stop in Chicago, also marks the end of Chicago Rapid Transit operation for North Shore limited trains. Here the Rapid Transit crew steps off and a North Shore Line crew takes over. With final clearance and maybe some train orders from the Howard Street tower, the *Electroliner* swings westward onto the Skokie Valley high-speed route. The Shore Line suburban trains continue straight north at Howard Street.

All this time the train has been running on third-rail power, but beginning some three miles beyond Howard Street overhead trolley is used. The

**North Shore runs limited trains every hour over the Skokie Valley Route, which bypasses the busy suburban line through the lake-shore communities. Frequent local and express service uses all routes south of Waukegan. Below is a typical Skokie Valley scene. At right below is a station on the newly depressed section of the Shore Line Route. Extra rails are a gantlet so wide steam-road freight cars can be run past the high platform.**

motorman slows down to not much more than a walk and trainmen unsnap two of the diaphragms between cars and raise the two trolley poles. Two double buzzes in the cab announce that both poles are on the wire.

Now for some 20 miles we average better than 60 miles an hour, skimming at 75 or 80 through little communities that started to develop when the North Shore built this route in 1926. To our left are the Skokie Valley freight-line tracks of the North Western. End of the Skokie line is South Upton Junction, where local trains diverge to the left toward Libertyville and Mundelein. We turn right, preparatory to rejoining the original route at North Chicago Junction. For some 2½ miles south of this junction the two tracks of the Skokie Valley Line and the two tracks of the Shore Line route are separated by the North Western's main line between Chicago and Milwaukee, and on both sides of all this railroading lies one of the country's largest naval bases, Great Lakes Naval Training Station. The North Shore does a heavy business here, especially on weekends, and as we pass through Downey, the Skokie station for Great Lakes, we see in the siding an eight-car train of Chicago elevated equipment used for overflow traffic between Great Lakes and Chicago.

Nestled down in a low spot, almost beneath the North Western tracks, is North Chicago

Junction. The Shore Line pokes abruptly out from an underpass and joins our tracks in a sharp curve and then immediately diverges again to go up through North Chicago and into a suburban terminal in downtown Waukegan. The small station is in a wye between the two lines and here passengers can transfer in four

All photos by George Krambles.

directions. Sailors armed with transfers from the Shore Line local get on here, bound for weekend leave in Milwaukee. North of the junction is a remarkably clear straight run through the west side of Waukegan, terminal of many Chicago suburban trains, and the far west sides of Zion, Kenosha and Racine. Being lightweight, the speed of the *Elec-*

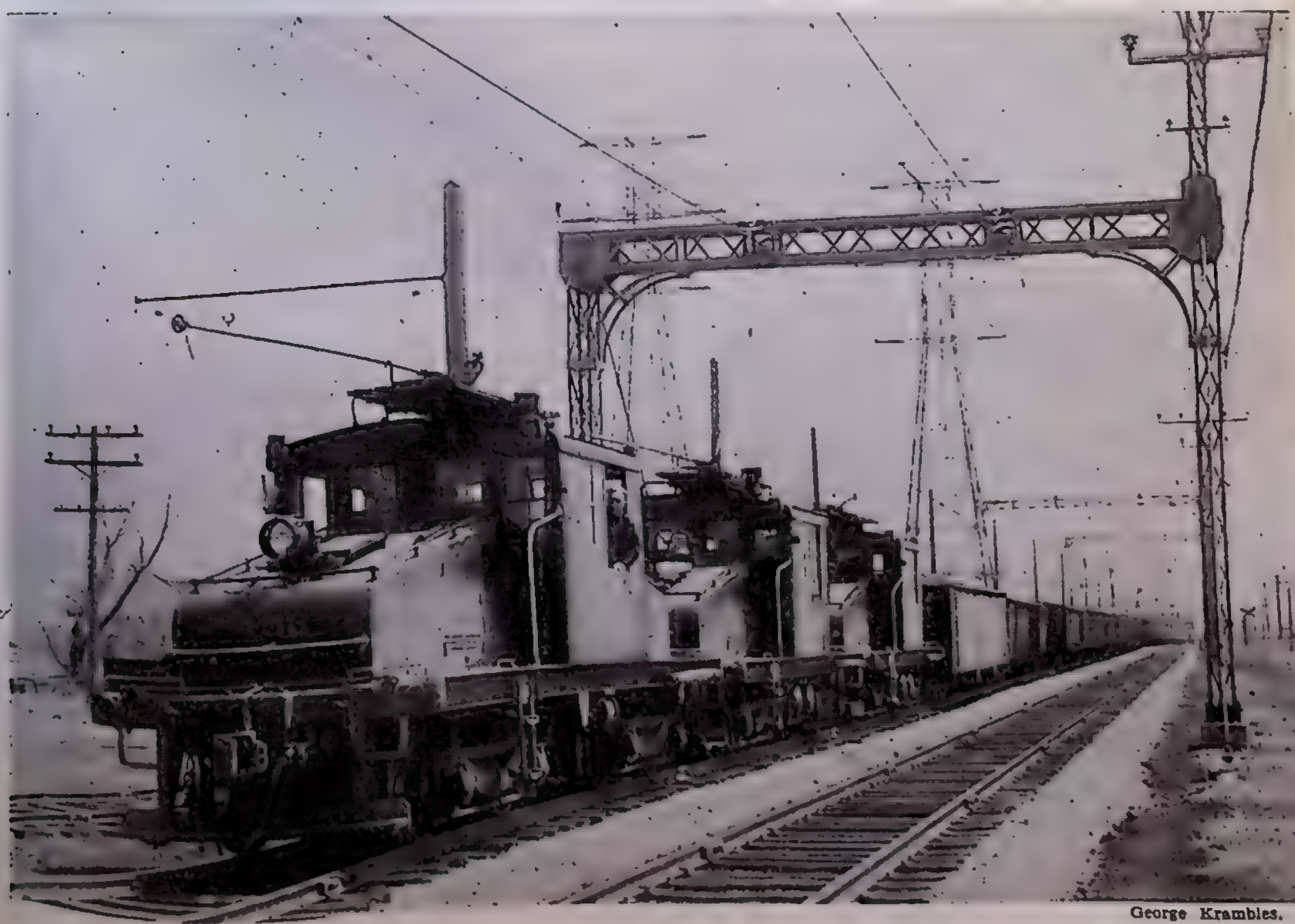
**Combination car stands in front of the North Shore office building at Highwood, where the shops are also located. Four-car articulated Electroliners, of which two were put in service just before the war, are North Shore's finest passenger equipment. They make the Chicago-Milwaukee run in 1 hour 50 minutes. Freight traffic is largely coal and highway trailers mounted on flat cars, pulled by either steeple-cab locomotives or merchandise cars in multiple.**

Top photos, George Krambles; bottom, C. E. Keevil, from Krambles collection.

*troliners* is considerably affected by load, line voltage and wind condition, but the speedometer in the motorman's cab, in case we can get a peek at it around the corner, will likely show over 80 miles an hour for much of this run. Just before reaching Harrison Street, end of private right of way at the South Side of Milwaukee, the line is on top of a high embankment from which one gets an excellent view of the Milwaukee Road's Chicago-Milwaukee main line angling beneath and the North Western's principal Milwaukee roundhouse. Here we begin running on city streets, and the *Electroliner* spurts along much the same as a P. C. C. car. The cars of the two *Electroliner* trains, which alternate on the same five leaving times both northbound and southbound, are extremely short in order to negotiate the sharp curves of the Chicago Elevated. Three are coaches and one is a lunch car, complete with bar. The entire interior is air-conditioned.

For the trip back let's try a limited train of standard heavy steel equipment. The 75 700-series cars form the bulk of the mainline equipment. In addition to these are 7 250-series combination passenger and baggage cars, 48 150- to 197-series passenger cars used principally in suburban service, and the 400-series cars, including diners and the open-rear-platform parlor-observation cars which since the war have been converted into straight passenger service without the open platforms. All these cars are similar in exterior appearance but utterly unlike the cars of any other railroad except for a certain family resemblance to the equipment of the Chicago, Aurora & Elgin, which also operates into Chicago over the elevated.

If we leave Milwaukee on the 7 a. m., 12 noon or 6 p. m. train, we may take a meal in the diner. While the North Shore equipment was not originally designed with diaphragms and must be used around some sharp curves which prohibit the standard steam-road type, certain cars have been equipped with a special design which allows passengers to go from coaches into the diner. We find that the heavy cars operate with a substantial feel that is quite dif-



George Krambles.

Krambles collection.

In its early days the North Shore was a typical country interurban line. Trains didn't even run into Chicago but made connections with the elevated at Evanston. Most of this was changed in the early 1920's under the aggressive Insull management, which built the high-speed Skokie Route and improved the balance of the line. The interlocking tower below is at the C&NW crossing in Kenosha.

ferent from the easy "floating" atmosphere of the *Electroliners.* The speed seems to be about twice as fast, although actually the top speed is about the same, with slower acceleration and braking. At Waukegan extra cars may be added.

To get a look at the suburban Shore Line, which is the original main line between North Chicago Junction and Chicago, we ask the conductor for a transfer to the Shore Line at North Chicago Junction. It's only a few minutes' wait there for a train from the downtown Waukegan station, which takes us under the Chicago & North Western Railway and down the old line through the well-established suburban communities which give the North Shore the bulk of its commutation patronage. South of Fort Sheridan station we keep an eye open for the general office building and shops of the railroad which lie to the east of the track, in the north side of Highwood. Here a large display of equipment is usually lined up, especially before the afternoon rush hour, when trains are made up in anticipation of the heavier traffic.

The Shore Line route parallels for most of its distance the main line of the North Western, over which a heavy suburban business is also operated. We are likely to see several North Western passenger trains along the way and perhaps we may even race a suburban train from station to station. The electric train will get the edge on the starts, but the steam train has fewer stops and can maintain its speed better. Through Winnetka both railroads are separated from street grade, a project which was completed only a couple of years ago.

George Krambles.

Wilmette is the terminal of the Chicago Elevated service and from here in our Shore Line express will be sandwiched between "Evanston Specials" of the L. Evanston is a large residential suburb as well as the home of Northwestern University, and the North Shore, the Elevated and the North Western all do a big commutation business there. The south limit of Evanston is Howard Street, where we rejoin the Skokie Valley route.

Shore Line trains use trolley right in through Evanston (where the Elevated trains also use trolley) and past Howard Street, to Wilson Avenue. Southbound Skokie Valley trains also use trolley from Howard Street to Wilson Avenue (even though the northbound trains are here operated on third rail) because the southbound express track is used during early morning hours for hauling carload freight which might foul the third rail.

While the North Shore cannot compete on over-all speed with the steam roads between Milwaukee and Chicago, it serves more in-between communities, and, like many electric railroads, the frequency and flexibility of its service makes it really valuable to the territory it serves.

*Tenders aren't so heavy!*

**NOTICE**

Hereafter all locomotives shall be headed off turntable when on engine-house tracks.

R. H. Foreman

Both photos, Albert Farrow, 820 B Street S. E., Auburn, Wash.

# CERA'S PRIVATE CAR FOR RAILFANS

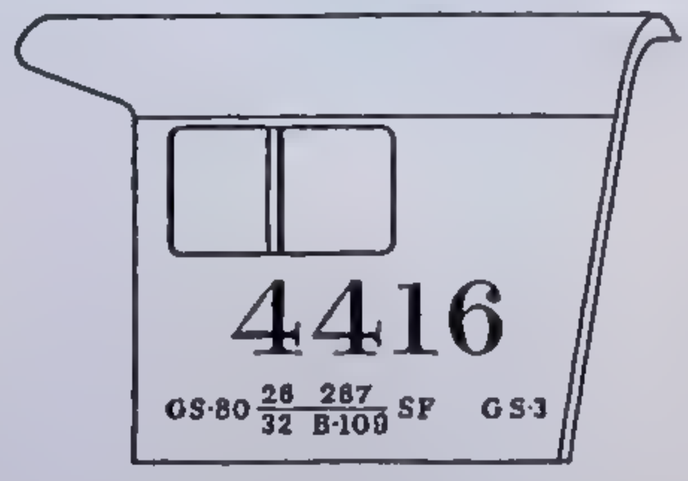
Car No. 300 of the North Shore Line is now lettered Central Electric Railfans' Association, and is used by the CERA for excursions over the North Shore system. The car is in good working order but is not adequate for regular service. Few railfan organizations have had such wonderful cooperation as the North Shore Line has given this serious group of electric railroad enthusiasts.

## SP Classification Markings

Cab markings of Southern Pacific locomotives convey a lot of information. In the drawing below, "4416" is, of course, the number of the engine. "GS-80" means the engine is a General Service type, with 80-inch drivers. "26/32" is the diameter and stroke of the cylinders in inches. "267" gives the weight on drivers in thousands of pounds; "B-109" indicates a booster on the trailing truck, with 109,000 pounds weight on the truck. "SF" indicates that the engine is equipped with superheater and feedwater heater. "GS-3" is the engine classification.

They don't count the wheels for us.

Weston B. Lazear.




## Kieran Misses One

The question of railroad gauge recently tripped up John Kieran, one of the experts of the radio feature "Information Please." Kieran and Dave Marshall, both on the staff of the New York *Sun*, were lunching together recently when railroads came into the conversation. Kieran bet Marshall $5.00 that the English track gauge is wider than American. It seems Kieran's experience was in France in 1917, when British Great Western engines derailed on curves built with American track gauges. But English and American track is gauged at an identical 4'-8½", and the wartime difficulty must have been because gauge was not properly widened on curves. So Kieran lost five bucks, but because this was not Monday evening, Marshall did not get a new set of the Encyclopedia Britannica.

# NARROW-GAUGE RAILROAD AT TEHERAN

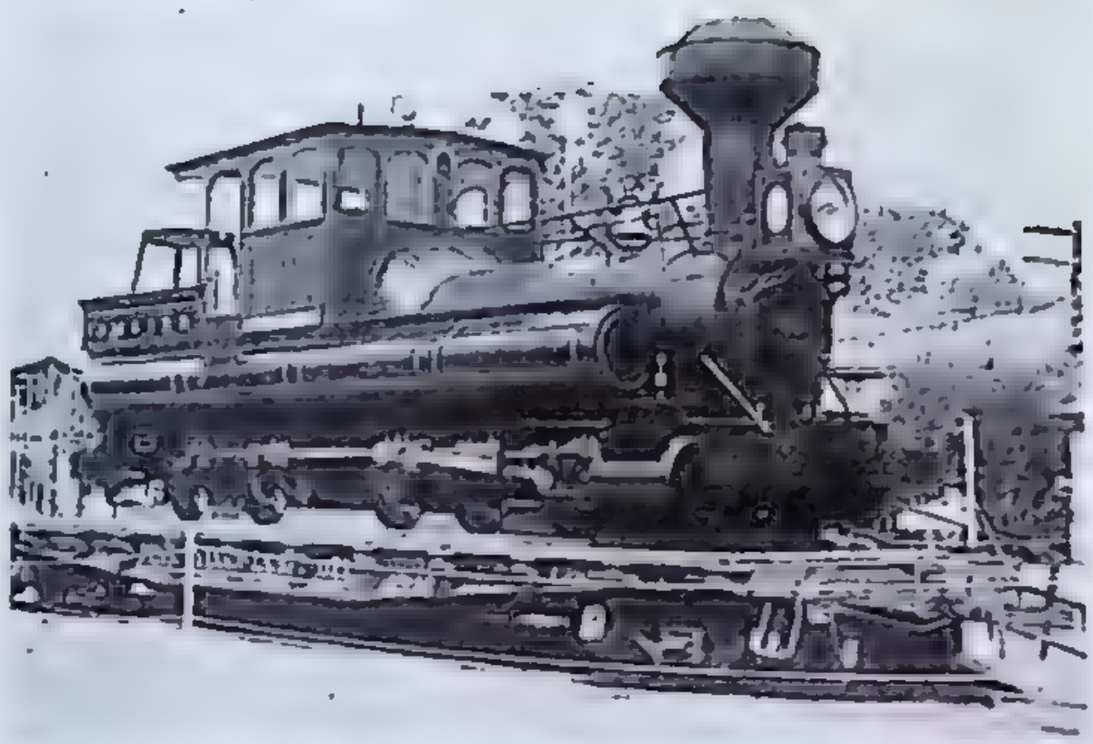
From a letter by Sgt. R. W. Richardson.

These pictures show what is probably the smallest locomotive in Iran. This meter-gauge engine, built in 1887 by Ateliers du Tubize, Belgium, runs on a 4½-mile railroad between Teheran and Ray, a suburb. Ray is built partly on the site of the ancient city ravaged by Tamerlane. From the line's terminal at Ray, the crumbling mud-brick walls of the ancient city can be seen scattered over the adjacent hills.

The line runs with trolley-car frequency and on Fridays does a tremendous business hauling the faithful to Ray, about a mile beyond which is Shah Abdol Azim Mosque, a place of pilgrimage. The fare is 3 rials (10 cents) for adults, half fare for children. Boys try to hitch rides and are sometimes thrown off while the train is going.

There is no evidence of freight equipment. Passenger cars are so small that men push them around by hand in the station to assemble a train. The station has no seats; would-be passengers are invited to sit on the floor. When it is time for a train to depart, a bell is rung and the crowd rushes out for a seat on the diminutive cars. In my picture of the engine, the engineer is quite concerned; he didn't understand a delayed-action shutter.

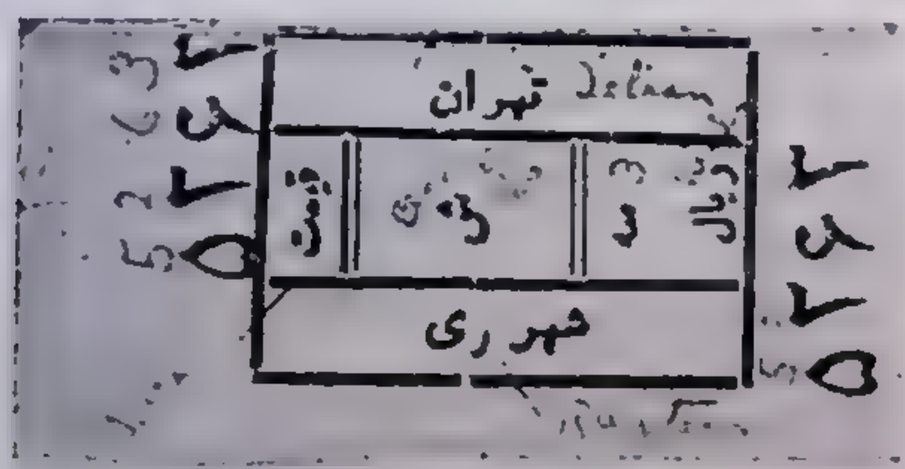
Sgt. R. W. Richardson



# USED ON MADISON (IND.) GRADE

One of the steepest grades in the country is the 5.89 per cent pull up the Ohio River bluff on the Pennsylvania's branch from Madison, Ind., to Columbus, Ind. Originally this line was operated by ropes, later by engines like No. 35 above, now by four specially equipped Class H-6sb 2-8-0's. The picture was taken by W. K. Aughenbaugh at Hamilton, O., when No. 35 (of the Jeffersonville, Madison & Indianapolis Railroad) was on exhibit. It was known as the *Reuben Wells*, named for its designer. The firemen worked in a pit about six feet below the cab floor. The cylindrical tanks on the side held water. Cylinders were 20″ x 24″; wheel arrangement, 0-10-0; weight, 110,400 pounds; tractive force, 24,410 pounds. The engine, retired in the early 1900's, was the first to climb a 6 per cent grade without the use of cog rails.

The special H-6sb's now used on the grade, which was cut through a solid rock cliff nearly 100 feet high, have special sanding devices, compression brakes and other equipment not found on the usual locomotive. In negotiating the Madison hill the engines head up the grade and back down it.




Ticket is black and white.

Sgt. R. W. Richardson.


WHILE FIVE SONS AND A GRANDSON ARE IN SERVICE

## Agent and Mrs. White "Can All They Can"

● Over in Concord, Nebraska, "North Western's" Cecil G. White is busy with his daily tasks. His is a service record of many years. But since war came the Whites have won distinction in another way—*five sons and a grandson wear Uncle Sam's fighting uniforms.*

You might say this is enough glory for one family. But patriotic Mrs. White thought differently. She turned to victory gardening and last year canned over 600 quarts of fruits and vegetables. *That's* deserving of comment. This year she expects to do as well or better!

But to get back to the White boys.

Russell, a 1st Lieutenant of Marines, has seen action at Guadalcanal and Tarawa, and is now on Saipan. Sergeant Vilas is over in New Guinea. Vernon, in the Southwest Pacific, is a Navy Aerographer's Mate. Norman, still in the States, is an Air Cadet, while Private Merton is at Camp Phillips, Kansas. Then there's Jerry, Lieut. Russell's son, in Officers' Training Camp at San Diego.

Marvin, we might add, enlisted in the army in 1939, but received a medical discharge last September. He's still carrying on, though . . . in a Minneapolis defense plant.

A most unusual family, you'll agree. Every member is doing what he can to hasten victory. "North Western" is proud of the Whites—they and their kind are the backbone of America.

CHICAGO and NORTH WESTERN SYSTEM

SERVING AMERICA IN WAR AND PEACE FOR ALMOST A CENTURY

Both photos from collection of C. E. Fisher, 20 Wilde Dr., Waban 68, Mass.

# Early Action Photos

THE late A. F. Bishop of New Haven, Conn., was one of the outstanding photographers of trains in the country. Working under the difficulties of the '80's and '90's, he secured his focus by having his wife stand alongside the track. When Mrs. Bishop was otherwise engaged, a small boy or even a driven peg or a stone furnished the point of focus. Crews were advised in advance and the fireman would put on a liberal supply of green coal before reaching the spot. Thus Photographer Bishop obtained pictures showing action as he preserved New Haven equipment for posterity.

No. 227, above, was built by Rhode Island in 1892. It weighed 110,000 pounds and had 19"x24" cylinders and 69" drivers, and was one of the most powerful engines the road had at that time. More ornate but less powerful was the 128, below, which was built in the New Haven's own shops in 1884. Weighing 81,600 pounds, it had 18"x22" cylinders and 68" drivers, and was resplendent in shining brass and red, gold and black paint. Notice the absence of running boards on the locomotive, the long line of windows and single door per side in the mail car, and the low-top smoker.

The main line of the New Haven when these pictures were taken was between New York and Springfield, Mass., and the 128 is shown leaving New Haven for Springfield. No. 227 is approaching New Haven from what is now the Shore Line.

# *Indispensable--*

to the nation, in war or peace, is railroad transportation. Two-thirds of the tremendous passenger and freight loads during these war years have been carried by rail. No method yet has been devised in transportation to replace the major role of the railroads to keep the country moving. While first call on all efforts is to win the war...Frisco also is planning and working for extensive improvements and modernization to better serve America in the years ahead.

**FRISCO LINES**

ST. LOUIS-SAN FRANCISCO RY.

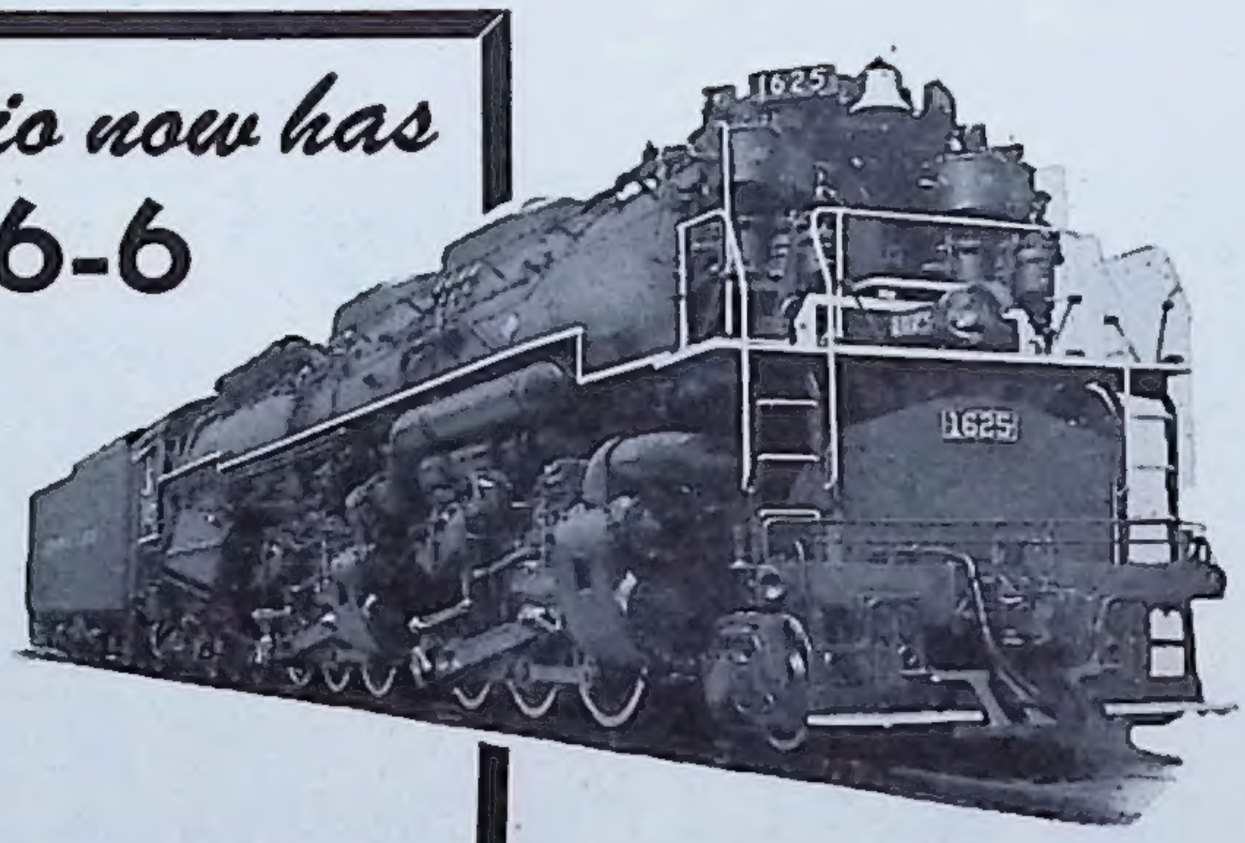
*A Great Railroad*

*Chesapeake & Ohio now has*

# 30 2-6-6-6

*Allegheny Type*

# LIMAS




The C&O hauls thousands of tons of coal daily from mines high in the Alleghenies, where the road reaches an elevation of 2,072 feet above sea level and grades are in excess of 1.14 per cent, with curves of 6 degrees.

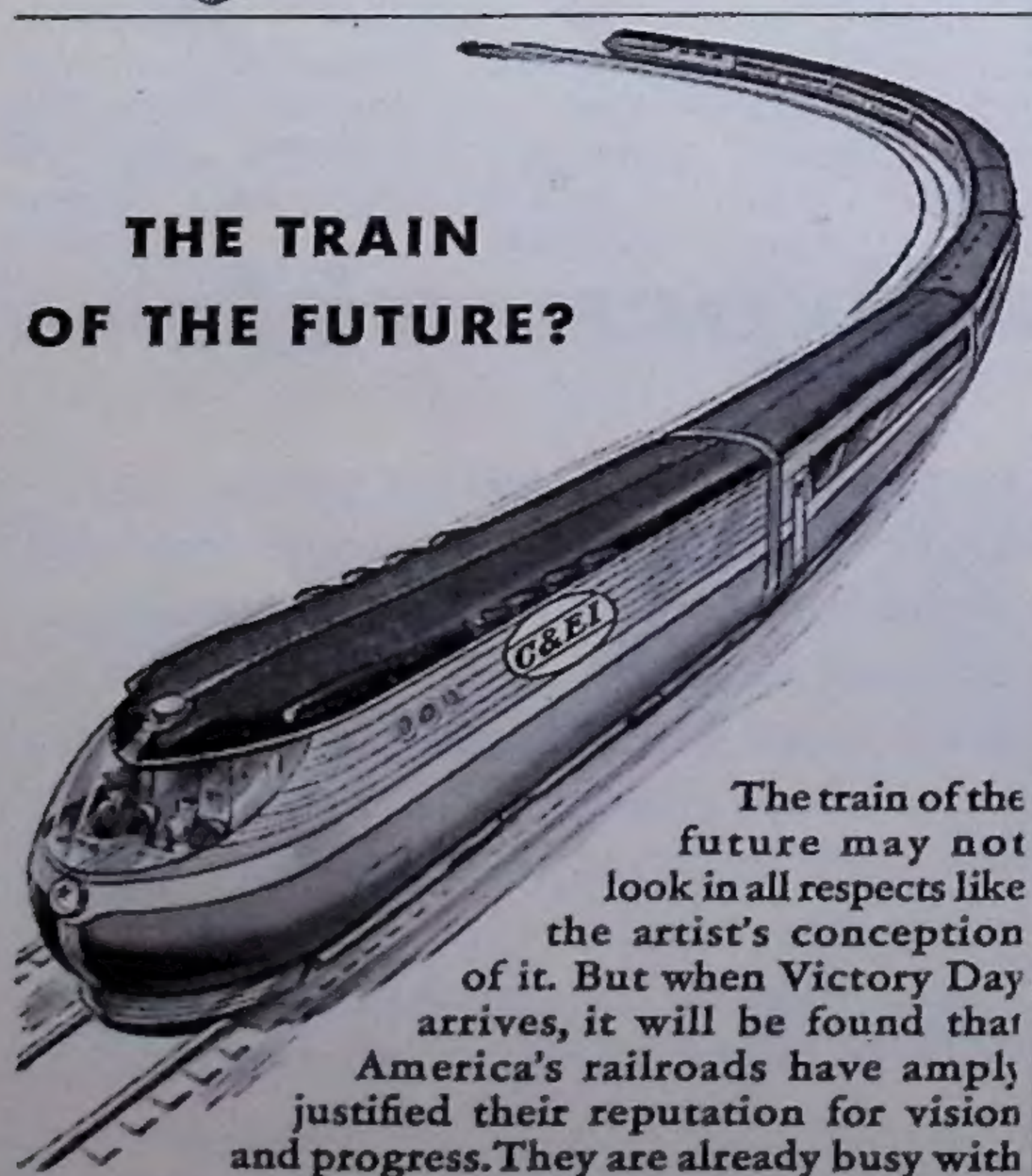
For such hauls the C&O uses the most powerful 4-cylinder, 6-coupled engines ever built, the "Allegheny Type" Limas. Ten of these were placed in service in 1941, ten more a year later, and now another ten gives the C&O a fleet of thirty of these Lima-built super-power locomotives, with fifteen more building.

LIMA LOCOMOTIVE WORKS INCORPORATED

**LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO**



**THE TRAIN OF THE FUTURE?**



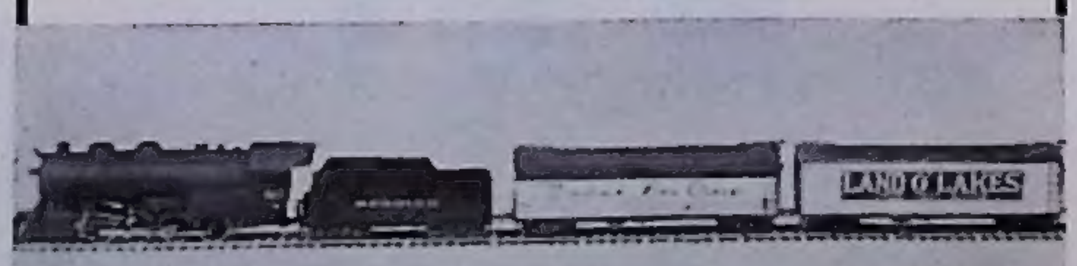

The train of the future may not look in all respects like the artist's conception of it. But when Victory Day arrives, it will be found that America's railroads have amply justified their reputation for vision and progress. They are already busy with plans that will provide finer transportation than the public has even dreamed possible. Rail-fans will find C&EI right up among the leaders.

***Chicago & Eastern Illinois Railroad***

***C&EI***



# OWN YOUR OWN RAILROAD




Building scale models of cars, locomotives and even the right of way, itself, is a hobby leading to endless enjoyment.

Write for our booklet on miniature railroading along with our pre-war catalogue—It's interesting reading—Price 25c.

**MANTUA METAL PRODUCTS CO.**
**Woodbury Heights - New Jersey**

# Correspondence

I have an old legal tome dealing with the foreclosure and reorganization proceedings of the Colorado Midland between 1894 and 1898. Sandwiched in between all the whereases and to-wits, it contains a lot of interesting information. One little item is a petition filed by the receiver on September 23, 1896: "Wherefore, your petitioner prays that an order may be entered by this Honorable Court, authorizing and directing your petitioner to purchase five (5) additional locomotives, of such pattern as he may approve, at a cost not to exceed sixty thousand dollars ($60,000)." Apparently locomotives did not come very high in those days. Neither did box cars, as I notice that the Honorable Court had no sooner given the nod to the request for the new engines than Receiver Ristine again prayed to the Honorable Court (this time on "the 24th day of December, A. D. 1896") for two hundred (200) additional box cars "at a cost not to exceed one hundred and twenty thousand dollars ($120,000); and your petitioner further prays that he may be authorized to execute his notes, as such Receiver, for the entire amount of the purchase price of said cars, or so much thereof as he may be unable to pay in cash." Evidently the Honorable Court was in a mood to answer Receiver Ristine's prayer, and the box cars were duly forthcoming as requested.

Carl B. Hewett, 2511 Front View Cres., Denver 11, Colo.

I'm looking forward to the day when I return to the States, to smell soft-coal smoke, to hear the call of the whistles in the night, to hear the bark of a double-header coming up the hill, to see New Mexico again from a speeding Santa Fe train, to feel that I'm part of the most wonderful game in the world—railroading! This is what I'm fighting for.

Pvt. F. Ray McKnight, U. S. Army.

Perhaps some day the "powers that be" will really try to gain the favor and fancy of the public, and start "selling" trains by using some of the famous old names which have been discarded and others which spell romance and the glory of motion: *Overland Limited, Pacific Mail, Atlantic Limited, Overland Mail, Oregon Trail, Natchez Trace.* I could mention many more. Add some neat gray mohair uniforms for waiters and porters instead of the white and white-and-blue combinations that look bedraggled an hour after fresh ones have been donned, and a long step toward making things pleasant will have been taken.

Arthur J. G. Illian, New York, N. Y.

Dr. Thomas U. Johnson, whose article on the C&PA was in the July issue of TRAINS, was in England as medical officer with a parachute battalion prior to D Day. Recently a letter I had written to him was returned from his Army address with the notations "Missing" and "Verified." Two days later I received the July number and saw the article on the C&PA, about which he had written me.

Sgt. Robert W. Richardson, U. S. Army.

Have you ever seen eight locomotives on one train, all trying to blast their stacks off? I did, on a heavy coal drag upgrade into Thomas on the Western Maryland's Elkins line. All the locos in this service are heavy Consolidations and after passing Thomas several of the engines are cut off and returned down the hill, backing all the way.

Paul Daniels, 621 S. 2nd St., Millville, N. J.


# Do It Now

Books, maps and prints are high on the Christmas gift list again this year. For that reason the rush will be heavier than ever before. To make sure that you obtain these gifts for your friends, place your order now.

Two of our prints are fine reproductions of watercolor paintings, "Noonday Water Stop," by Gil Reid, and "Westbound Freight," by Kent Day Coes. A third print is a reproduction of the oil painting "Way Station" by A. Sheldon Pennoyer, and another is of the Union Pacific "Big Boy" reproduced from a Kodachrome. All prints in this group are 14 x 9 inches in size, printed on special extra-thick enameled paper, size 19 x 12½ inches with wide white margins and no lettering. When framed they make a superb gift for that friend who appreciates railroad realism. Each, $1.00.

The maps, one of the railroads of Pennsylvania at 50 cents and one of Colorado railroads at $1.00, have become a *must* among those who would keep up to date on railroads. Both maps are the result of months of research and attention to detail. Every known railroad, past and present, is shown. Never before has there been offered a map or even a combination of maps that give so much railroad information. The Pennsylvania map is 22 x 17 inches and the Colorado map is 38 x 24. Both are color-lithographs and are printed on heavy, durable stock.

Here are the books that should be in every railroad library:

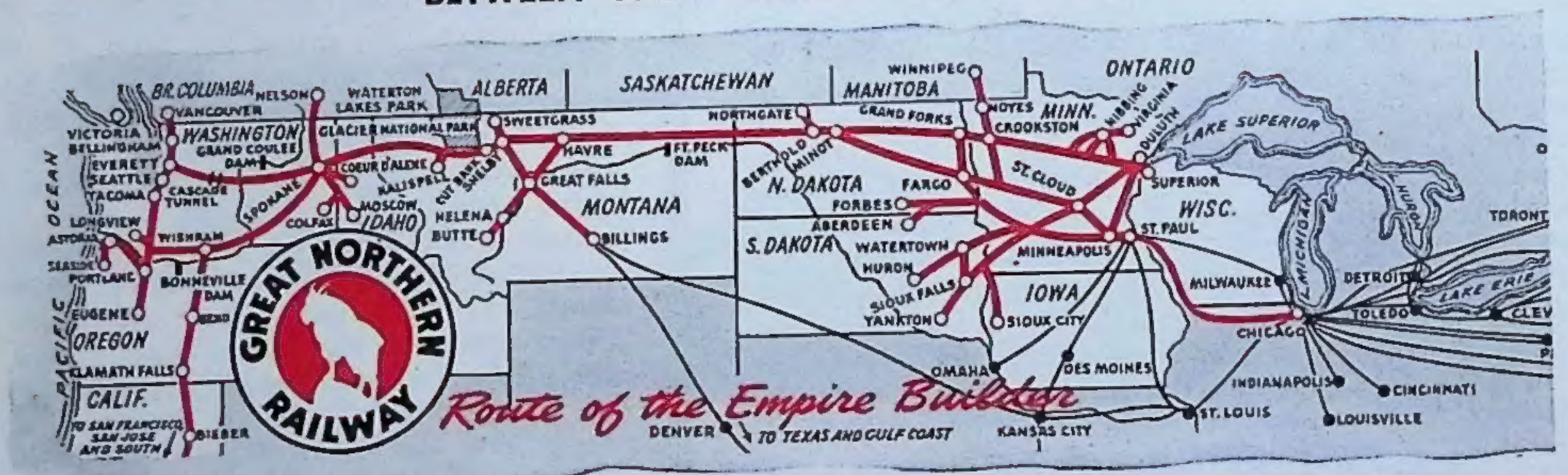
**Railroad Panorama, by A. C. Kalmbach** ..... $2.75
A collection of revised TRAINS articles.
**Clear the Tracks, by Joseph Bromley** ..... $2.75
The story of an old-time engineer.
**This Fascinating Railroad Business, by Robert Selph Henry** ..... $3.50
The industry from top to bottom.
**Transport For War, by Edward Hungerford** $1.50
Railroad accomplishment in World War II.
**Trains in Transition, by Lucius Beebe** ..... $5.00
Recent changes in American railroading.
**Iron Horses, by E. P. Alexander** ..... $5.00
Famous locomotives from 1829 to 1900.
**Railroading From the Head End** ..... $3.50
Railroading from the angle of the railfan.
**Portraits of the Iron Horse, by R. S. Henry and Otto Kubler** ..... $2.00
A good book for children as well as adults.
**Bonanza Railroads, by Gilbert H. Kneiss** $3.00
The story of five early western railroads.
**High Iron, by Lucius Beebe** ..... $5.00
Prose and pictures.
**Trains, by Robert Selph Henry** ..... $2.50
A father-and-son book.
**The Big Four, by Oscar Lewis** ..... $3.75
The story of the Central Pacific.
**Highliners, by Lucius Beebe** ..... $5.00
A photo album by a famous photographer.

War Bonds make excellent gifts too!

**Kalmbach Publishing Co.**
1027 N. 7th St. Milwaukee 3, Wis.

# GREAT NORTHERN RAILWAY

## BETWEEN GREAT LAKES AND PACIFIC




# LIGHTER, FASTER FREIGHT CARS

## of Plywood, Steel and Lumber

Sheathings of ⅝-inch Douglas fir plywood are placed outside and inside steel and lumber superstructure.

Interiors are sprayed with varnish. The plywood first is treated with a "sealer" to prevent warping.

### Combination of Materials Results in Sturdiness, Less Weight

Construction of the American railroad industry's first plywood-steel freight cars is under way by Great Northern Railway in its own shops.

Another symbol of progressiveness—one of the many things which make Great Northern great—1,000 of these new, bright orange-painted freight cars will be in wartime transportation service before Winter.

Developed by company technicians, the modern, 50-ton capacity cars are a combination of steel, Douglas fir plywood and lumber.

Lighter-than-conventional steel was utilized for underframes, while lumber and steel form the superstructures. Outside and inside sheathings, including ceilings, are of ⅝-inch plywood. To prevent warping, the plywood is treated with a "sealer."

Two tons lighter than the conventional box-car, the plywood-steel units roll faster because of high-speed trucks, non-harmonic springs and wrought steel wheels. Steel ends and metal roofs add to sturdiness.